# REPORT RESUMES

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AN ASSESSMENT OF TYPEWRITING SKILLS IN THE SECONDARY SCHOOLS OF THE STATE OF UTAH IN RELATION TO JOB ENTRY REQUIREMENTS.

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DESCRIPTORS- *TYPEWRITING, *PROGRAM EFFECTIVENESS, *JOB SKILLS, TIME FACTORS (LEARNING), *PROGRAM LENGTH, CLASS SIZE, SCHOOL SIZE, GRADE ORGANIZATION, HOMEWORK, STUDENT TESTING, *ACHIEVEMENT GAINS, HIGH SCHOOLS, UTAH,

THE PURPOSE OF THIS STUDY WAS TO DETERMINE HOW MANY SEMESTERS OF TYPEWRITING SHOULD BE OFFERED TO AN ABLE STUDENT TO ATTAIN EMPLOYABLE SKILL. THE INFLUENCE OF THE FOLLOWING FACTORS ON TYPEWRITING ACHIEVEMENT WAS STUDIED--(1) STUDENT GRADE LEVEL, (2) CLASS SIZE, (3) SCHOOL SIZE, (4) LENGTH OF CLASS PERIOD, (5) USE OF MANUAL OR ELECTRIC TYPEWRITERS, (6) HOMEWORK ASSIGNMENTS, AND (7) ADDITIONAL TYPEWRITING INSTRUCTION. THE STUDENTS TYPEWRITING TESTS, TYPEWRITING II, SECOND SEMESTER, OF THE UNITED BUSINESS EDUCATION ASSOCIATION, WERE ADMINISTERED TO 853 JUNIOR AND 781 SENIOR HIGH SCHOOL STUDENTS SELECTED THROUGHOUT THE STATE ON A PROPORTIONAL, STRATIFIED RANDOM SAMPLE BASIS ACCORDING TO THE SIZE OF THE SCHOOL. FEDERAL CIVIL SERVICE AND UTAH EMPLOYMENT SECURITY EMPLOYMENT STANDARDS WERE USED TO JUDGE ACHIEVEMENT LEVEL. FINDINGS BASED ON AN ANALYSIS OF VARIANCE OF THE DATA INCLUDED--(1) A SIGNIFICANT DIFFERENCE WAS FOUND BETWEEN THE AVERAGE GROSS-WORDS-PER-MINUTE RATE BETWEEN FIRST-, SECOND-, THIRD-, AND FOURTH-SEMESTER STUDENTS WITH THE RATE INCREASING WITH EACH ADDITIONAL SEMESTER OF INSTRUCTION, (2) NO SIGNIFICANT DIFFERENCE WAS FOUND BETWEEN FOURTH-, FIFTH-, OR SIXTH-SEMESTER STUDENTS, AND (3) 8.6 PERCENT OF THE JUNIOR HIGH SCHOOL AND 9.5 PERCENT OF THE SENIOR HIGH SCHOOL STUDENTS TESTED MET FEDERAL CIVIL SERVICE REQUIREMENTS. SOME RECOMMENDATIONS WERE THAT THE FIFTH AND SIXTH SEMESTERS OF TYPEWRITING INSTRUCTION BE DROPPED, JUNIOR HIGH STUDENTS BE PERMITTED TO TAKE TWO SEMESTERS OF TYPEWRITING, CLASS LENGTH BE 45 MINUTES, AND CLASSES HAVE ENROLLMENTS OF 41 OR MORE STUDENTS. (PS)

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OFFICE OF THE STATE SUPERINTENDENT OF PUBLIC INSTRUCTION

Produced by the Utah Research Coordinating Unit
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OFFICE OF THE STATE SUPERINTENDENT OF PUBLIC INSTRUCTION

Produced by the Utah Research Coordinating Unit
for Vocational and Technical Education, Salt Lake City.

at the request of

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1967

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# AN ASSESSMENT OF TYPEWRITING SKILLS IN THE SECONDARY SCHOOLS OF THE STATE OF UTAH IN RELATION TO JOB ENTRY REQUIREMENTS

## Introduction

One of the goals of typewriting instruction is for students to acquire an employable skill. However, schools have no set standards on the number of semesters of typewriting instruction which are required for students to attain an employable typewriting skill.

A questionnaire concerning curricular offerings was recently sent to all junior and senior high schools of the state of Utah by the Business and Office Education Specialist of the Utah State Board for Vocational Education. From the returns received, a great variation in the number of semesters of typewriting presently being taught in the secondary schools of the state of Utah was noted.

Most junior high schools offer two semesters, or one year, of typewriting; while a few offer no typewriting; some only offer one semester; and some offer as much as four semesters of typewriting.

All senior high schools in the state of Utah replying to the questionnaire offer typewriting, but even more variation was noted in the number of semesters being offered at the senior high level than at the junior high level. Some senior high schools offer only two semesters, or one year, of typewriting instruction; most of them offer four semesters, or two years; and a few offer as many as six semesters. Also, some senior high schools offer classes in addition to the regular typewriting classes, such as personal-use typewriting and speed-building typewriting. Indeed, the secondary schools of the state of Utah have no uniformity among themselves in the number of semesters of typewriting that are being taught.

## Statement of Problem

The basic purpose of this study was to determine how many semesters of typewriting should be offered for students to be able to attain an employable skill. Are some schools offering too much typewriting and others not enough? Are students who are taking as many as six semesters of typewriting wasting their time, and could they be using it to better advantage by taking other classes? On the other hand, do students need six semesters of typewriting instruction to attain an employable skill? Specifically, the objectives of this study are:

1. To make an extensive review of literature to determine the job entry requirements for beginning workers and to determine the skill levels being attained by typewriting students as a function of the number of semesters of typewriting instruction.

2. To determine through random sample testing the typewriting skill being attained by students in the secondary schools of the state of Utah as a function of the number of semesters of typewriting instruction.

3. To compare the skills attained with employment standards for entry jobs in the state of Utah in an effort to determine if these standards are being met and at what level of typewriting instruction they are being met.

4. To determine from the results of the tests the influence, if any, of factors which might possibly affect the skills attained by the typewriting students tested. The factors to be considered are:

   a. Grade levels of typewriting students.
   b. The size of the school.
   c. The size of the typewriting class.

d. The length of the class period.
e. The use of manual or electric typewriters.
f. Homework assignments.
g. Additional typewriting instruction.

5. To determine curricular implications from the findings of this study related to the above objectives.

Delimitations

The delimitations of this study include the following factors:

1. This study was restricted to junior and senior high schools in the state of Utah which offer one or more semesters of typewriting instruction.

2. This study was restricted to an assessment of a typist's straight-copy skill as measured by the United Students Typewriting Tests to determine whether typists were meeting employment standards.

3. This study was restricted to employment standards for Federal Civil Service positions and standards set by the Utah State Employment Security Service.

Limitations

The findings resulting from this study were limited in several ways. These limitations include:

1. Not all tests which were sent out were administered and returned.

2. Teachers and students may have had an incomplete understanding of the instructions and may not have followed them correctly.

3. A lack of complete accuracy of work performed by the assistants in correcting the tests and in correctly following the scoring instructions given may have been in existence.

4. Performance of students on the Students Typewriting Test may not be the same as if given the Federal Civil Service or Utah Employment Security typewriting tests.

5. Although the tests were all mailed out from Utah State University at the same time, there was a considerable difference in the time that they were received at the individual schools which in some cases made it impossible for the tests to be administered on the specified days.

6. Shortened class periods necessitated some tests having to be administered during more than one class period.

## Definitions

1. Entry jobs: initial jobs; jobs which require no previous work experience.

2. Secretary: a person who schedules appointments, gives information, takes dictation, and otherwise relieves officials of clerical work.[1]

3. Stenographer: a person who takes dictation in shorthand of correspondence, reports, and other matter, and transcribes dictated material using the typewriter.[2]

4. Clerk Typist: a person who performs general clerical work requiring use of the typewriter in majority of duties.[3]

5. Typist: a person who types reports, stencils, forms, addresses, or other straight-copy material from rough draft or correct copy.[4]

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[1] United States Labor Department, Bureau of Employment Security, DICTIONARY OF OCCUPATIONAL TITLES, 1965, Vol. I: DEFINITIONS OF TITLES, (3rd Edition, Washington, D. C.: U. S. Government Printing Office, 1965), 635.

[2] U. S. Department of Labor, p. 692.

[3] U. S. Department of Labor, p. 136

[4] U. S. Department of Labor, p. 767.

6. Gross words a minute: the total words typed divided by the time of the test with no deduction for errors.[5]

7. Correct words a minute: the deduction of the number of errors from the total words typed.[6]

8. Net words a minute: the deduction of a ten-word penalty for each error made during the time interval used.[7]

## REVIEW OF LITERATURE

### Job Entry Requirements for Beginning Office Workers

From a review of literature to determine job entry requirements for beginning office workers, a wide range of job entry requirements was found. One of the lowest minimum requirements for beginning office workers was that quoted for junior typists. Ruegg[8] reports an employment agency director as stating a junior typist is a typist who can typewrite for five minutes at the rate of 30 to 40 words a minute with no more than two errors a minute. Typists who were less efficient than this could not qualify for a position. This is in agreement with the statement in an article by Lessenberry[9] which states that most high school seniors can write longhand at a rate of 25 to 30 words a minute. If typists can write this fast in longhand and if they can only typewrite at speeds of less than 30 words a minute, the advantage of speed of production of typewritten copy over copy written in longhand is eliminated.

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[5] Allien R. Russon and S. J. Wanous, PHILOSOPHY AND PSYCHOLOGY OF TEACHING TYPEWRITING, (Cincinnati, Ohio: South-Western Publishing Company, 1960), 37.

[6] Russon, p. 37.

[7] Russon, p. 36.

[8] Robert J. Ruegg, "Typewriting Standards in Business," BUSINESS EDUCATION FORUM, XIII (November, 1958), 29-30.

[9] D. D. Lessenberry, "Basic Skills for Better Personal Typewriting," BUSINESS EDUCATION FORUM, X (November, 1955), 11-12.

A minimum of 35 words a minute, was noted by Clark[10] as the requirement for beginning workers. His study was undertaken to determine the skill in typewriting needed by prospective office workers in the Los Angeles area. Thirty-six companies participated in this investigation. He found that the minimum typewriting speed required for a clerk-typist ranged from 35 to 65 words a minute. However, he also noted that employees typing only 40 words a minute could qualify for employment in only 25 of the companies.

A minimum typewriting skill of 35 to 40 correct words a minute was required for beginning typists as determined by a study of finance companies made by Reid.[11] In figuring correct words a minute, one word is deducted from the total words typed for each error that is made. Therefore, students may actually be able to type more words a minute than this, but because of the error penalty they could not qualify.

Forty words a minute was the minimum speed required as determined by several studies. One such study was a survey made by Kalbaugh.[12] He found that applicants were not employed if they lacked skill to type at least 40 words a minute on a ten-minute test. The businessmen surveyed felt that less than this was not considered an adequate skill.

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[10] J. L. Clark, "Are Classroom Typewriting Standards Compatible with Office Standards?" BUSINESS EDUCATION FORUM, XVII (December, 1962), 23.

[11] Doris B. Reid, "Standards for Beginning Office Workers in a Finance Company," BUSINESS EDUCATION FORUM, XVII (May, 1963), 15,18.

[12] A. J. Kalbaugh, "Requirements for Beginning Office Employees," BUSINESS EDUCATION FORUM, XI (December, 1956), 27-28.

Goldsmith[13] also found that standards required by companies and the city, state, and federal governments were usually 40 words a minute on a ten-minute test. Currently the minimum speed requirement for Civil Service positions is 40 words a minute with a minimum of three errors on a five-minute, straight-copy typewriting test.[14] Perry[15] made a study to determine minimum speed standards for beginning office and technical positions at Lockheed-California. He found the minimum speed standard was 40 net words a minute on a ten-minute test. Net words a minute is figured by deducting ten words from the total words type for each error that is made.

One of the most comprehensive studies of office standards completed in recent years was made by the National Office Management Association's National Vocational Requirements Committee.[16] Questionnaires were sent to companies in the United States and Canada. There were 1,059 replies received. For beginning stenographers, the typewriting requirements were indicated as follows: 40 words a minute, 12 per cent; 50 words a minute, 60 per cent; 60 words a minute, 26 per cent; and other, 2 per cent. Therefore, 86 per cent of these companies required a typing speed of at least 50 words a minute.

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[13] Samuel Goldsmith, "A Study of Standards for Typewriting and Shorthand," BALANCE SHEET, XXXIX (January, 1958), 205-210.

[14] United States Civil Service Commission, 2400 R2, FEDERAL OFFICE ASSISTANT EXAMINATION, STENOGRAPHER, TYPIST, CLERK, AND OFFICE MACHINE OPERATORS: WHAT IT IS AND HOW IT IS GIVEN (Washington, D. C., 1964), 33.

[15] Richard S. Perry, "Standards in Various Offices," BUSINESS EDUCATION FORUM, XVII (May, 1963), 7-10.

[16] NATIONAL OFFICE MANAGEMENT ASSOCIATION, VOCATIONAL REQUIREMENTS, CONTAINING SUGGESTED STANDARDS FOR BEGINNING OFFICE JOBS. Survey Summary No. 10 (1950). In Mathilde Hardaway and Thomas B. Maier, TESTS AND MEASUREMENTS IN BUSINESS EDUCATION (Cincinnati, Ohio: South-Western Publishing Company, 1952), 271.

Fifty words a minute was again found to be the skill requirement for most companies in a study made by Gryder and Boggs.[17] They surveyed 45 branch offices of Manpower, Incorporated, in 33 states in an attempt to determine a representative cross-section of the typewriting and shorthand skill levels required by businessmen. It should also be noted that even though the majority stated they required 50 words per minute, fifteen of the forty-five branch offices, or one-third, required 60 words a minute for most typewriting positions.

Harrison[18] surveyed 305 business firms in Westchester County, New York. She found that the most frequently required typing speeds were 45 net words a minute, 50 gross words a minute, and usually 50 net words a minute on pre-employment typewriting tests with an error allowance of 5 being most frequently used.

Pearson[19] stated in her article that the most common requirement for an excellent typewriting rate was 55 gross words a minute (no deduction for errors), good was 50 words a minute, and average was 40 words a minute.

Sixty words a minute was recommended by office managers in a study made by Rahe.[20] Day[21] also obtained similar results in a nationwide study. He traveled through 34 states and interviewed many businessmen and school administrators. He found that a typewriting speed of 50 to 60 words a minute was the skill level required by business offices throughout the nation. The businessmen he interviewed also reported that accuracy is by far the most important consideration. Mulkerne[22] also agreed with this as he stated that even though passing grades in typewriting classes may be as low as 65 to 70 per cent accuracy, perfection, or near perfection, is expected by businessmen.

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[17] Robert Gryder and Lohnie Boggs, "Shorthand and Typewriting Skills Required by Business." BUSINESS EDUCATION FORUM, XV (November, 1960), 35-36.

[18] Lois Y. Harrison, "What Business Looks for in Clerical Workers," FOUNDATION FOR BUSINESS EDUCATION BULLETIN (March, 1967), 16-18.

[19] Vera M. Pearson, "Evaluating Pupil Achievement in Typewriting," BUSINESS EDUCATION FORUM, XXI (November, 1966), 10.

It should be noted from this review of literature in an effort to determine job entry requirements that it is impossible to state one set standard. Businessmen do not agree on acceptable standards. Their requirements ranged from a minimum of 30 words a minute to as high as 65 words a minute, with most businessmen generally requiring 40 to 50 words a minute. It should also be noted that most of these stated requirements were taken from surveys. Businessmen were only giving their opinions as to what they felt should be the typewriting speed required.

## Skill Levels Attained by Typewriting Students

From a review of literature to determine the skills attained by typewriting students, it was found that typewriting students attain a wide range of skills.

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[20] Harves C. Rahe, "Performance Standards in Typewriting," UNITED BUSINESS EDUCATION ASSOCIATION FORUM, VII, No. 2 (November, 1948), 38-41. In Mathilde Hardaway and Thomas B. Maier, TESTS AND MEASUREMENTS IN BUSINESS EDUCATION, (Cincinnati, Ohio: South-Western Publishing Company, 1952), 269-270.

[21] Elmore M. Day, Jr., "Training for Office Careers," OFFICE EXECUTIVE, XXV (April, 1956), 15-17.

[22] Donald J. Mulkerne, "What Do Typists Do?" BUSINESS EDUCATION WORLD, XLII (September, 1961), 24-25.

Very few studies were found stating the skill levels attained by first semester students. Lessenberry[23] stated in his article that teachers accept a typewriting skill of 18 to 20 words a minute as satisfactory for the average students at the end of the first semester of work.

Several studies have been made to determine the skill of students at the end of two smesters, or one year, of typewriting. Nelson[24] made a study of selected Iowa Public High Schools to determine the speed and accuracy achieved after thirty weeks (or two semesters) of typewriting instruction. The average number of gross words a minute attained by these students ranged from 38.31 to 40.38. The correct words per minute ranged from 36.47 to 38.59, and the net words per minute ranged from 21.30 to 24.01. He felt this study indicated that students tend to achieve standards in terms of gross words a minute, but that they do not meet standards in terms of net words a minute.

The purpose of a study made by Casady and Masson[25] was also to determine speed and accuracy scores of first-year typewriting students. They found that at the end of thirty-six weeks of instruction, 31 per cent were typing less than 15 net words per minute. One-half typed only 21 net words per minute. They felt that only one-half of the students who take typewriting achieve a really usable skill at the end of only one semester of typewriting instruction, and that only one-half of the students completing one year of typewriting instruction can type faster than 33 words a minute.

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[23] Lessenberry, p. 11-12.

[24] Richard A. Nelson, "A Study of Selected Iowa Public High Schools to Determine the Speed and Accuracy Achievement After Thirty Weeks of Typewriting Instruction," M. A., Iowa State Teachers College (Cedar Falls), 1954. (Original not seen, abstracted in NATIONAL BUSINESS EDUCATION QUARTERLY, XXIV (Fall, 1955), 64.

[25] Cleo P. Casady and William J. Masson, "Realistic Standards for Beginning Typewriting," BUSINESS EDUCATION FORUM, XIV (May, 1960), 25.

Another survey to determine the speed and accuracy of typewriting students at the end of the first year of instruction was conducted by Savinski.[26] She tested 6,185 students in 191 large and small high schools in 35 states on five-minute timed writings. She found that the students attained an average gross speed of 41 words a minute with six errors, which would then be 29 net words per minute. She found that almost three-fifths (59.3 per cent) of the students typed at speeds within the relatively narrow spread of 35 to 50 gross words a minute.

A similar study was made by DeHomer.[27] However, she found a lower average speed than Savinski. She found that at the end of 36 weeks of instruction, the average student could type from 30 to 36 words a minute on a five-minute timed writing with an average of one error a minute.

A survey of the skills attained by third semester typewriting students was made by Jiles.[28] He found a median straight-copy rate of 46 words a minute.

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[26] Joan Savinski, "41 and 6," THE BUSINESS TEACHER, XXV (March, 1958), 10.

[27] Dorothy Jean DeHomer, "Speed and Accuracy Standards for First-Year Typewriting," M.S., State University of Iowa (Iowa City, 1956) (Original not seen, abstracted in NATIONAL BUSINESS EDUCATION QUARTERLY, XXVI (Fall, 1952), 19-20.)

[28] Russell F. Jiles, "A Survey of Production Rates and Production Quality of Third Semester Typing Students in Selected Wisconsin High Schools," M.S., The University of Wisconsin (Madison). (Original not seen, abstracted in NATIONAL BUSINESS EDUCATION QUARTERLY, XXVIL (Fall, 1958), 39.)

Shubnell[29] found from her study of third semester typewriting students a median straight-copy rate of 43 words a minute. Forty-six per cent of the students she studied attained scores that ranged between 50 and 60 words a minute.

McCoy[30] made a study of achievement of students in second-year typewriting to determine the degree to which basic typewriting skills are extended as a result of instruction provided in the second year of typewriting in secondary schools. He found a mean score of 46.96 gross words per minute on the test administered at the end of the second year of instruction and a mean score of 25.76 net words per minute. From this study, he made the following conclusions:

> 1. At the end of one year of instruction in typewriting, the ability of students is generally limited both in terms of proficiency in typewriting straight copy material and in proficiency in performing production-typewriting work. They may possess proficiency sufficient to meet their own personal-use typewriting standards, but they generally do not possess proficiency sufficient to satisfactorily meet standards for employment in business positions involving extensive utilization of the typewriter.
>
> 2. At the end of the second year of instruction in typewriting, the ability of the students in terms of proficiency in typewriting straight-copy material and in performing production typewriting work is generally greater to a statistically significant degree. The ability of approximately 80 per cent of the students in typewriting straight-copy material tends to remain at levels below the speed and accuracy employment standards that have been established through research techniques. Their proficiency in typewriting production work undoubtedly is below that required for employment, although standards in this regard continue to be nebulous.

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[29] Sister Mary Lee Shubnell, SSND, "A Survey of Production Rates and Production Quality of Third Semester Typewriting Students in Selected Catholic High Schools in Wisconsin," M.S., The University of Wisconsin (Madison), 1959. (Original not seen, abstracted in NATIONAL BUSINESS EDUCATION QUARTERLY, XXIX (Fall, 1960), 62.)

[30] Carl McCoy, "A Study of Achievement in Second Year Typewriting," Ed.D. Study, University of Oklahoma (Norman), 1959.

3. In general, it may be concluded that the extent of learning of students through the course of instruction in the second year of typewriting is such that selected individuals should continue to be afforded the opportunity to gain the typewriting proficiency required for employment by means of that second year of instruction. At the same time, extensive improvement in learning at the second year of typewriting is required if significant numbers of individuals are to be enabled to achieve employment standards of proficiency.

Lamb[31] makes a summary statement of the standards of achievement established by research workers for straight copy typewriting for semesters one through four. She states that the approximate median standard for typing straight copy that is usually expected at the end of one semester is 30 net words per minute; at the end of two semesters it is 40 net words per minute; at the end of three semesters it is 50 net words per minute; and at the end of four semesters it is 60 net words per minute.

From this review of literature to determine the skill achievement of typewriting students, it was noted that there was no set skill that students attain at each level of typewriting instruction. There were insufficient studies to determine the achievement of first semester typewriting students. For the second semester typewriting students, the lowest average gross typewriting speed found from the review was 30 gross words a minute, with other studies indicating 33, 38, 41, and 50 gross words a minute. For third semester typewriting students, the lowest median straight copy typewriting rate found was 43 words a minute; and for the fourth semester students, McCoy's study indicated 46 gross words per minute, with 25 net words per minute as average. It should also be noted that there is a lack of sufficient research done in this area to determine a definite skill achievement that should be expected by students as a function of the number of semesters of typewriting instruction they have taken.

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[31] Marion W. Lamb, YOUR FIRST YEAR OF TEACHING TYPEWRITING (Cincinnati: South-Western Publishing Company, 1959), 279.

## METHODS AND PROCEDURES

### Selection and Description of Test

In an effort to select a test to be used in this study, a review was made of the Utah State University library's card catalogue, THE BUSINESS EDUCATION INDEX, THE EDUCATION INDEX, volumes of MENTAL MEASUREMENT YEARBOOK by Oscar K. Buros, and TESTS IN PRINT also by Oscar K. Buros, to determine tests that were available. From these sources, the names and addresses of 14 companies publishing typewriting achievement tests were obtained. These tests were ordered, and 12 tests were received.

These tests were then carefully reviewed to determine which one would best meet the purposes of this study. The test selected was the Students Typewriting Tests, Typewriting II--Second Semester, published by the United Business Education Association. This particular volume of the test was prepared by the United Business Education Association Research Foundation's Committee on Tests under the direction of the chairman, Miss Ruthetta Krause, Associate Professor of Business, Indiana State Teachers College, Terre Haute, Indiana. The purpose of this test is to measure the students' vocational application of their typewriting skill. The problems were kept suitable in content for a second-semester course in typewriting. In building this test, the skills, abilities, and types of information considered essential at the end of the second semester of instruction were determined by test experts. Their selection of items to be included in the test was based upon the major textbooks in typewriting, studies of typewriting achievement, and actual classroom experience. Specialists in typewriting devised the problems which would most closely measure the achievement to be expected at the end of the second semester of instruction. The problems were then examined by additional testing specialists for clarity of expression, suitability to the test's stated purpose, and practicability from the standpoint of administration, scoring, and interpretation of results. A pre-test was administered to several classes of students for a try out to determine students' capabilities of interpreting the instructions, to eliminate unwieldy test items, to obtain balance in the test items, and to select those problems and materials that best measure student achievement. Revised tests were then administered to hundreds of students throughout the nation, using a random sampling technique to select the classes in which the tests were to be given. The students' scores were tabulated and presented in tables of percentile ranks. There are detailed instructions for administering the test and for scoring the papers which allows little variation in the measurement of the students' achievement.

## Selection and Description of Sample

Population. The population of this study was the junior and senior high schools in the state of Utah offering at least one semester of typewriting.

Selection of junior high schools. The junior high schools of the state were divided into three groups according to total enrollment as follows: 0-499, 500-999, and 1,000-over. From each group was taken a random sample by using a table of random numbers. The size of the sample was determined by using the following table:

Table 1. Selection of Junior High School Sample

| Group | Total Enrollment | Per Cent of Total | Number of Schools | Sample | Total Type Enrollment |
|---|---|---|---|---|---|
| 0-499 | 4,806 | 09 | 16 | 2 | 908 |
| 500-999 | 27,086 | 52 | 35 | 18 | 5,936 |
| 1,000-over | 20,114 | 39 | 17 | 6 | 4,476 |
| | 52,006 | 100 | 68 | 26 | 11,320 |

The total enrollment figure was obtained from the UTAH PUBLIC SCHOOL DIRECTORY, 1966-67, of the Utah State Board of Education. The typewriting enrollment figure was obtained from the questionnaires sent out by the Business and Office Education Specialist of the Utah State Board for Vocational Education. This is only an approximate figure since all schools did not return the questionnaire and not all schools who did return the questionnaire reported a typewriting enrollment figure.

Ten per cent of the typewriting enrollment figure, or 1,132, was the number of tests that was decided to be administered. The number of schools to be sampled from each group was determined by finding the per cent each group was of the total junior high school enrollment. As indicated by the preceding Table, two schools were to be selected in the 0-499 group, 18 from the 500-999 group, and 6 from the 1,000-over group, or a total of 26. Each school in each group was then randomly assigned a number, and then a table of random numbers was used to select the particular schools to be used in this study.

The number of tests to be administered by each group was determined first of all by finding the per cent of the sample of the total sample and then taking this per cent of the total tests to be administered. The number of tests to be administered by each school in each group was determined by finding the per cent of the typewriting enrollment of each school to the total typewriting enrollment of the group. Detailed charts showing these procedures can be found in the appendix.

If the school offered more than one class of typewriting in the category to be tested, the teachers were instructed to place the hour of each class on separate sheets of paper and place them in a hat. Then the teacher was to randomly draw out the class to be tested. The same procedure was followed for the selection of the students in the class that were to be tested. After the selection of the class to be tested had been made, the names of the students in the class were put into a hat and the predetermined number of students was selected.

*Selection of senior high schools*. The senior high schools were also divided into groups according to total enrollment as follows: 0-499, 500-999, 1,000-1,499, and 1,500-over. The senior high schools to be used as the sample were selected in the same manner as the sample of junior high schools. Charts indicating in more detail these procedures can also be found in the appendix.

After the selection of the sample had been made and the number of tests to be administered had been determined, 2,200 tests were ordered and a list of the schools selected as the sample was sent to the Business and Office Education Specialist of the Utah State Board for Vocational Education. The Business and Office Education Specialist then proceeded to obtain consent to administer the tests from the superintendent of each school selected to be part of the sample.

## Administration of the Test

As soon as the tests were received, they were sent to the schools that the superintendents had consented to allow to participate in this study. Along with the tests were attached a student data sheet asking for the student's name, his grade level, his sex, the semesters of previous typewriting instruction, the kind of typewriter used during the test, and whether or not he had had any other typewriting classes in addition to the classes regularly offered by his school, such as summer typewriting. A teacher data sheet was also included to be filled out by the teacher for each class to which the test was administered. This sheet asked for the number of tests administered, the title of the class used for testing, the number of semesters this class was offered, the class enrollment, the length of the class period, the number of days per week the class meets, and whether or not homework assignments were given. A general instruction sheet and a sheet containing specific instructions for administration of the test were also enclosed. The teachers were told in the instructions the purpose of the test and how to select the class and the students to be tested. They were also instructed to administer the test during one class period on either Tuesday, May 2, Wednesday, May 3, or Thursday, May 4. However, due to a delay by some schools in receiving the tests, a few of the teachers were not allowed sufficient time to plan ahead and adjust their schedules; therefore, it was necessary for some of these tests to be administered on other days. Also because of shortened class periods, a few of these tests were administered in two class periods rather than only one.

## Scoring of the Test

The teachers were instructed not to score any part of the test but to return them to Utah State University as soon as the tests had been administered. Thirty-five schools out of the 43 administered the test--22 junior high schools and 13 senior high schools. When these tests were received, six persons were selected from one of the intermediate typewriting classes at the University to help in scoring. The scoring directions and chart for determining scores on the timed writings which were sent with the tests were used in scoring the tests. Before beginning the scoring process, each grader was instructed by the writer as to how to score each part so each would be scoring them as nearly as possible in the same manner.

## Statistical Analysis

When the scoring of the tests was completed, the information on the Teacher Data Sheet and the Student Data Sheet, including the scores for each part and also the net words per minute and the correct words per minute on the timed writing were key punched on IBM cards. The results were then tabulated by the computer giving us the range, mean, and standard deviation of the total points on the test, the gross words per minute, the errors, the gross words per minute minus the errors, the correct words per minute, and the net words per minute, on the timed writing. The range, mean, and standard deviation were given according to type of school (junior or senior high school), school enrollment, class enrollment, length of class period, on manual or electric typewriters, homework assignments, and additional typewriting instruction for semesters of typewriting one through six. The number of students meeting the Federal Civil Service standards and the Utah Employment Security standards was also given for each of the above categories. An analysis of variance was also made to determine any significant differences at the .05 and .01 per cent levels of significance.

# FINDINGS

The findings of this study were based on the application of an analysis of variance statistic to the data found in this study. Factors were compared as to their function in the success of typewriting achievement. The .05 and .01 per cent levels were used as the levels of significant differences.

A total of 2,194 tests were sent to the randomly selected sample of 26 junior high schools and 17 senior high schools throughout the state of Utah. Of that total, 1,634 tests were completed and returned. This represented responses from 22 junior high schools and 13 senior high schools, making a return of 74.6 per cent of all tests sent with 85.3 per cent of the junior high schools and 76.5 per cent of the senior high schools actually administering the tests.

The number of students to whom the tests were administered at each level of instruction is indicated in the following table.

Table 2. Number of students to whom the Students Typewriting Tests were administered

| Semesters of Instruction | Junior High School Students | Senior High School Students | Total |
|---|---|---|---|
| 1 | 106 | 19 | 125 |
| 2 | 742 | 432 | 1,174 |
| 3 | 2 | 50 | 52 |
| 4 | 3 | 245 | 248 |
| 5 | 0 | 31 | 31 |
| 6 | 0 | 4 | 4 |
| Total | 853 | 781 | 1,634 |

## Comparison with National Norms

The national norms of this test were based on the scores on the Typewriting II--Second Semester Student Typewriting Tests of hundreds of students who had completed two semesters of typewriting. The students tested were selected by random sampling techniques.

In comparing the Utah secondary school students tested with the national norms, one must remember that all the students who were tested were given the Typewriting II--Second Semester Test, even though some of the students had received only one semester of typewriting instruction while others had received as much as six semesters of instruction.

As indicated in Table 3, the national average for total points on the Students Typewriting Tests, Typewriting II--Second Semester, was 97. None of the junior high school students met the national average. The junior high students closest to the national average were second and third semester students who had an average score of 82. The third-semester senior high school students had an average of 98, surpassing the national average by one point. The fifth-and sixth-semester students also surpassed the national average with average scores of 115 and 119 respectively. However, the fourth-semester senior high students had the highest average score, which was 123.

Combining all Utah secondary schools tested, both junior and senior high school students, the national average was reached by students who had three or more semesters of typewriting instruction.

## Skills Attained

The first determination to be made was the skill attained by students in the secondary schools of the state of Utah as a function of the number of semesters of typewriting instruction. The skill attained was measured by the Students Typewriting Tests. Table 4 shows the mean achievement scores of all the students tested as a function of the number of semesters of typewriting instruction.

The matrix at the bottom of the tables where significant differences were found indicate between which classifications the differences occurred and whether the differences were significant at the .05 or .01 per cent level of significance. "A" indicates a significant difference at the .01 per cent level of significance. "B" indicates a significant difference at the .05 per cent level of significance. "N" indicates no significant difference.

Significant differences were found for each mean achievement score at the .01 per cent level of significance. First-semester students had the lowest average gross words per minute rate, and a significant difference was found at the .01 per cent level of significance between the average gross words per minute rate of first-semester students and the students who had two or more semesters of instruction. A significant difference at .01 per cent level of significance was also found in the average gross words per minute rate between second- and third-semester students and also between the third- and fourth-semester students, with the average gross words per minute rate increasing with each additional semester of typewriting instruction. However, no significant difference was found between fourth-and fifth-semester students or between fourth-and sixth-semester student. Also, no significant difference at the .05 per cent level of significance was found between fifth- and sixth-semester students.

First-semester students also made the largest average number of errors. A significant difference at the .01 per cent level of significance was found in the average number of errors made by first-semester students and students having two or more semesters of typewriting instruction. However, no significant difference at the .05 per cent level of significance was found beyond this point among students having from two to six semesters of typewriting instruction. Significant differences at the .01 per cent level of significance were the same for the average gross words minus errors, the correct words per minute, and the net words per minute rate. Significant differences were found between first- and second-semester students, between second- and third-semester students, and between third- and fourth-semester students at the .01 per cent level of significance. However, no significant differences were found between the fourth- and fifth-semester students, the fifth- and sixth-semester students and the fourth- and sixth-semester students.

The skill achievement of the students tested was further broken into whether the students were junior or senior high school students. The skill achievement for junior and senior high school students is found in Tables 5 and 6. For first-semester students, significant differences were found at the .01 per cent level of significance for average number of errors made, the gross words minus errors rate, the correct words per minute rate, and the net words per minute rate, with the senior high school, first-semester students having the best average score in each achievement category.

Significant differences at the .01 per cent level of significance were found between second-semester junior and senior high school students in the average number of errors made, the gross words minus errors rate, and the net words per minute rate, with the junior high school, second-semester students having the best scores for each achievement category.

No significant differences were found between third-semester junior and senior high school students. The only significant difference found between fourth-semester junior and senior high school students was at the .05 per cent level of significance for the average gross words per minute rate. The senior high school students had the highest average score--54 compared to 40. No junior high school students tested reported having five or six semesters of typewriting instruction.

### Comparison with Employment Standards

A comparison of the skill achievement of the students with employment standards was also completed. Since there was such a variety of employment standards listed by businessmen for beginning office workers, the requirements for Federal Civil Service postions and the requirements of the Utah Employment Security Service, an affiliate of the United States Employment Service were used as the basis of comparison. However, one must keep in mind the limitation that the performance of the students on the Students Typewriting Tests may not be the same for each student as if given the Federal Civil Service Examination or the Utah Employment Security Typewriting Test.

The minimum acceptable speed for Federal Civil Service positions was 40 gross words per minute with three or less errors on a five-minute, straight-copy typewriting test. This scale graduates to 70 gross words per minute with 12 errors or less. If the applicants do not type at least 40 gross words per minute, the test is not scored for accuracy.

The Logan, Cache County, Office of the Utah State Employment Security Service reported that for entry jobs a beginning typist must be able to type at least 50 words per minute if typing on a manual typewriter and 55 words per minute if typing on an electric typewriter on a five-minute, straight-copy typewriting test. The number of words per minute is determined by subtracting one word for each error made from the gross words per minute. No limit is set on the number of errors as long as the applicant can meet the speed requirement of 50 or 55 words per minute after the errors have been deducted.

Forty words per minute with three errors or less was used as the basis of comparison. Table 6 indicates the number of students tested who met the Federal Civil Service employment standards. Only 73 out of 853 junior high school students or 8.6 per cent, met these standards. These students were all second-semester students. Also, only 74 out of 781 of the senior high school students tested, or 9.5 per cent, met these standards. Only 8.2 per cent of the senior high school students who had two semesters of instruction met these standards; 16.5 per cent of the students who had four semesters of instruction met them; and 19.4 per cent of those having five semesters of instruction met them.

Using 50 words per minute for students typewriting on manual typewriters and 55 words per minute for students typewriting on electric typewriters as a basis of comparison, Table 7 indicates the number of students tested who met employment standards for the Utah Employment Security Service. Only 47 students, or 5.5 per cent of the 853 junior high school students tested, met these standards; and 134, or 17.2 per cent of the 781 senior high school students met them. The 47 junior high school students who met these standards were all second-semester students. The highest per cent found meeting these standards at the senior high level was 37.9 per cent at the fourth-semester level of instruction.

Only 5.8 per cent of the senior high school, second-semester students met the standards set by the Utah Employment Security Service, 14.0 per cent of the third-semester senior high school students, 38.4 per cent of the fourth-semester senior high school students, 22.6 per cent of the fifth-semester students, and 25.0 per cent of the sixth-semester students. This is indicated in Table 8.

### Influence of Other Factors

Grade Level. The influence of factors which might possibly affect the skills attained by the typewriting students tested was the next consideration. The first factor to be considered was the grade level of the students. Tables 9 to 14 indicate the skill achievement for semesters one through six for grade levels eight through twelve.

A significant difference at the .01 per cent level of significance for first-semester students was found in the average number of errors between the eighth- and ninth-grade students and also between the ninth- and tenth-grade students, with the number of errors decreasing as the grade level increased. However, no significant difference was found in the number of errors made between the tenth-and eleventh-grade students, the eleventh- and the twelfth-grade students, and the tenth-and the twelfth-grade students. The same significant differences at the .01 per cent level of significance were found in the average gross words minus errors rate and the average net words per minute rate with the significant differences occurring up to grade ten and no significant differences beyond this point.

Similar significant differences were found for second-semester students when considering the influence of the grade level of the students. Significant differences at the .01 per cent level of significance were found in the average number of errors made and the average net words per minute rate, with significant differences at only the .05 per cent level occurring between the eighth-and ninth-grade students and at the .01 per cent level of significance between the ninth-and tenth-grade students. However, in this instance, the eighth-grade students made the fewest average number of errors and had the highest net words per minute rate. Again no significant difference at the .05 per cent level of significance was found among the average achievement scores of the tenth, eleventh, and twelfth-grade students.

No analysis of variance was made for the third, fourth, fifth, or sixth-semester students since the computer program did not have the capability to adjust for varying numbers of treatments.

In considering the number of students meeting Federal Civil Service employment standards as a function of the grade level of the students, one can note in Table 15 that twelfth-grade students had the highest per cent who met these standards--13.5 per cent met the standards. The next highest were the eleventh-graders who had 11.7 per cent. The eleventh-graders had the highest per cent who met the Utah Employment Security standards. The eleventh-graders had 27.2 per cent who met these standards compared with 24.5 per cent of the twelfth-graders, 6.1 per cent of the eighth-graders, 5.4 per cent of the tenth-graders, and 5.0 per cent of the ninth-graders. This is shown in Table 16.

School Enrollment. The skill achievement of students according to school enrollment is indicated for each semester of typewriting instruction in Tables 17 to 22. Since all treatments were not present, an analysis of variance was not computed for first-semester students.

Second-semester students in schools with enrollments of 1,500-over had the highest average gross words per minute rate, and students in schools with enrollments of 500-999 had the lowest gross words per minute rate. No significant difference at the .05 per cent level of significance was found between the average gross words per minute rate of students in schools with enrollments of 500-999 and those with the next highest average gross words per minute rate, which was students in schools with enrollments of 1,000-1,499. A significant difference at the .01 per cent level of significance was found between students in schools with enrollments 0-499 and 500-999. A significant difference was also found between students in schools with enrollments of 1,000-1,499 and schools with enrollments of 0-499. A significant difference at the .01 level of significance was also found between students in schools with enrollments of 0-499 and those with enrollments of 1,500-over. The students in schools with enrollments of 1,500-over had the higher gross words per minute rate.

Students in schools with enrollments of 0-499 made the largest number of errors, and there was a significant difference found at the .01 per cent level of significance between the 0-499 school enrollment classification and each of the other classifications. However, among the other three classifications, no significant differences were found.

Schools with enrollments of 0-499 and 500-999 had an average rate of 30 gross words minus errors. A significant difference at the .05 per cent level of significance was found between the two classifications with the lowest score and with the classification with the highest score which was the 1,000-1,499 classification. A significant difference at the .05 per cent level of significance was also found between schools with enrollments of 1,000-1,499 and schools with enrollments of 1,500-over.

Students in schools with enrollments of 1,500-over had the highest average correct words per minute score. The lowest score was made by students in schools with enrollments of 500-999. However, no significant difference was found between schools with enrollments of 500-999 and the 1,000-1,499 classification which had the next highest average number of errors. No significant difference was found in schools with enrollments of 1,000-1,499 and 0-499. A significant difference at the .01 per cent level of significance was found between the 500-999 school enrollment classification and the 0-499 classification, with the 500-999 school enrollment classification having the lowest average number of errors. A significant difference was also found at the .01 per cent level of significance for students in schools with enrollments of 0-499, which was the second highest correct words per minute rate, and schools with enrollments of 1,500-over, which was the highest rate. A significant difference at the .05 per cent level of significance was found between the two classifications which had lowest average gross words minus errors rate which was the 0-499 classification and the 500-999 classification which both had a rate of 30 and the next highest rate which was 32 in the 1,000-1,499 classification. A significant difference was also found between the two lowest rates and the 1,500-over classification which had the highest rate. A significant difference at the .05 per cent level of significance was also found between the two highest rates which were the classifications 1,000-1,499 and 1,500-over.

The 500-999 classification had the lowest correct words per minute rate, and the 1,500-over classification had the highest. A significant difference at the .01 per cent level of significance was found between the 500-999 classification which had the lowest rate and the 1,000-1,499 classification which had the next highest rate. A significant difference at the .01 per cent level of significance was also found between the 1,000-1,499 classification and the 0-499 classification which had the next highest correct words per minute rate. A significant difference at the .01 per cent level of significance was found between the 0-499 classification and the 1,500-over classification which had the highest rate.

A significant difference at the .05 per cent level of significance was found between the lowest net words per minute rate and the highest net words per minute rate, which was between the schools with enrollments of 0-499 and 500-999. A significant difference at the .01 per cent level of significance was found between schools with enrollments of 500-999 and schools with enrollments of 1,000-1,499. However, no significant difference was found between the classifications with the two highest scores--schools with enrollments of 1,000-1,499 and 1,500-over.

No significant differences were found for third-semester students at the .05 per cent level of significance.

No significant difference was found between the two lowest gross words per minute rates for fourth-semester students. This was a comparison between schools with enrollments of 1,000-1,499 and 500-999. A significant difference at the .05 per cent level of significance was found between the next highest score, which was the 1,500-over classification and the lowest score. However, no significant difference was found between schools with enrollments of 500-999 and schools with enrollments of 1,500-over. A significant difference at the .01 per cent level of significance was found for schools with enrollments of 1,500-over and 0-499, with schools with enrollments of 0-499 having the highest gross words per minute rate. No significant differences were found in the average errors made by fourth-semester students.

No significant differences were found between the two lowest gross words minus errors rates of fourth-semester students which were found in the 500-999 and 1,000-1,499 classifications. However, there was a significant difference between the two lowest scores and the next highest gross words minus errors rate which was in the 1,500-over classification. A significant difference at the .05 per cent level of significance was found between the two highest gross words minus errors scores, with the 0-499 classification having the highest score.

The 0-499 classification had the highest correct words per minute rate, and a significant difference at the .01 per cent level of significance was found between this highest score and the scores in each of the other three classifications. However, no significant difference was found between any two of the other three classifications.

A significant difference at the .01 per cent level of significance was found between the 0-499 classification which had the highest average net words per minute rate and the 1,000-1,499 classification which had the lowest average net words per minute rate. The only other significant difference was at the .05 per cent level of significance between the 500-999 classification and the 1,000-1,499 classification, with the 500-999 classification having the better average net words per minute rate.

No analysis of variance was made for fifth and sixth-semester students since all treatments were not present.

Schools with a total enrollment of 1,500 and over had 22.5 per cent meeting Utah Employment Security standards as shown in Table 23. Next highest were schools with enrollments of 0-499 with 19.0 per cent meeting these standards. As shown in Table 24, schools with enrollments of 1000-1,499 had 11.1 per cent meeting Federal Civil Service Employment standards. Next highest were the schools with enrollments of 0-499 which had 9.0 per cent. This is compared to 8.4 per cent for schools with enrollments of 500-999 and 7.3 per cent for schools with enrollments of 1,500-over.

Class Enrollment. The skill achievement of the students tested as a function of class enrollment is found in Tables 25 to 30.

For first-semester students a significant difference at the .01 per cent level of significance was found for the average number of errors. The highest number of errors made was 33 in the 0-20 class enrollment classification. A significant difference at the .05 per cent level of significance was found between this classification and the classification 21-30 and also between the classification 31-40. A significant difference at the .01 per cent level of significance was found between the 0-20 classification and the 41-over classification. The next highest number of errors made was in the 21-30 classification, but no significant difference was found between this score and the score for students in the 31-40 class enrollment classification. A significant difference at the .01 per cent level of significance was found between these scores and the classification scoring the least number of errors which was the class enrollment classification 41-over.

The highest average gross words minus errors rate attained by first-semester students was in the class enrollment classification of 41-over. A significant difference at the .01 per cent level of significance was found between this score and the next highest which was the 31-40 classification. A significant difference was also found between the 31-40 classification and the 21-30 classification. However, no significant difference was found between the lowest score and the scores in the classifications 21-30 and 31-40.

The highest average correct words per minute rate was found in the 41-over classification. No significant difference was found in this classification and the next highest classification which was 0-20, and also no significant difference was found between the 41-over classification and the 31-40 classification. A significant difference at the .05 per cent level of significance was found between the 21-30 classification and the next highest classification, 31-40. Also, a significant difference was found between the lowest classification and the other two classifications at the .05 per cent level of significance.

The highest net words per minute rate was found in the 41-over classification. A significant difference was found between this score and the next highest at the .01 per cent level of significance, which was the 31-40 classification. A significant difference at the .01 per cent level was also found between the classifications with scores below 10 and the highest score which was 24, scored by students in the 41-over classification. No significant difference was found between the scores in the 0-20 classification and the scores in the 21-30 classification, nor between the 0-20 and the 31-40, or between the 21-30 and the 31-40 classifications.

The lowest average gross words per minute rate for second-semester students was 35 in the 0-20 classification. Next was 40 in the 31-40 classification. A significant difference at the .01 per cent level of significance was found between these two classifications. Next was 42 in the 41-over classification, and the highest was 43 in the 21-30 classification. The differences between the three highest scores were significant only at the .05 per cent level of significance. A significant difference at the .01 per cent level of significance in the number of errors made was found between the lowest rate which was 9 in the 31-40 classification and each of the other three classifications. No significant difference at the .05 per cent level of significance was found between the errors made in the 0-20 classification, the 21-30 classification, or the 41-over classification.

The highest gross words minus errors rate was found in the 21-30 classification. However, no significant difference was found between this score and the next highest score which was found in the 41-over classification. Differences at the .01 per cent level of significance were found between the 21-30 classification and the 31-40 classification and also between the 21-30 classification and the 0-20 classification, with the 21-30 classification having the highest score.

The 21-30 classification had the highest correct words per minute rate, and the 0-20 classification had the lowest. No significant differences were found between the highest score and the next highest score which was in the 41-over classification. A significant difference at the .05 per cent level of significance was found between the score of the 31-40 classification and the 41-over classification. A significant difference at the .01 per cent level of signficance was found between the lowest score in the 0-20 classification and each of the other three classifications.

All treatments were not present for third-semester students so no analysis of variance was made.

A significant difference was found at the .01 per cent level of significance for fourth-semester students in the average number of errors made and at the .05 per cent level of significance for the average net words per minute rate. The lowest number of errors occurred in the 41-over classification; and a significant difference was found at the .01 per cent level of significance between this classification and the classification with the highest number of errors, which was the 21-30 classification. A significant difference at the .05 per cent level of significance was found between the 0-20 classification and the 21-30 classification; between the 21-30 classification and the 31-40 classification; and between the 31-40 classification, and the 41-over classification.

The only significant difference found in the net words per minute rate was at the .05 per cent level of significance between the two lowest rates which occurred in the 0-20 classification and the 21-30 classification and the highest rate which occurred in the 41-over classification. No analysis of variance was made for the fifth-and sixth-semester students since all treatments were not present.

Table 31 indicates the number of students meeting Federal Civil Service Standards as a function of the class enrollment. Classes with enrollments of 41 or more students had the highest number meeting Federal Civil Service standards. They had 15.2 per cent. Next highest was the 31-40 classification with 12.6 per cent. The per cent then dropped to 7.9 per cent for classes with 0-20 students and 5.1 per cent for classes with 21-30 students. As shown in Table 32, the class enrollment classification with the highest per cent of students meeting Utah Employment Security standards was the classes with 41 or more students. They had 19.0 per cent compared with 11.2 per cent for classes with 0-20 students, 11.0 per cent for classes with 21-30 students, and 9.4 per cent for classes with 31-40 students.

Length of Class. The skill achievement of students according to the length of the class period is indicated in Tables 33 to 38. As indicated in Table 33, all treatments were not present for first-semester students. Therefore, an analysis of variance was not run.

As indicated in Table 34, significant differences at the .01 per cent level of significance were found in the average gross words per minute rate and the average correct words per minute rate of second-semester students. There was also a significant difference found between 35-45 minute class periods compared with 46-50 and 51-over. Students in the 35-45 minute classes had an average gross words per minute rate of 38 compared with 41 for the 46-50 class periods and 42 for the 51-over class periods. No significant difference was found between the average gross words per minute rate for students in the 46-50 minute classes and students in classes 51 minutes or more. The same results were found in the average gross words minus errors rate and the correct words per minute rate, except the average gross minus errors rate was significant only at the .05 per cent level of significance. No significant difference was found between the 46-50 minute classes and the 51-over minute classes. However, there was a significant difference between the 35-45 minute class periods and the class periods that were longer.

An analysis of variance was run for third-semester students, but no significant differences were found at the .05 per cent level of significance.

A significant difference was found for each achievement score for fourth-semester students at the .01 per cent level of significance.

In comparing the average achievement scores of the fourth-semester students with those for second-semester students, the results were entirely reversed. A significant difference was found for each achievement score between classes 35-45 minutes in length and the classes that were longer; but students in 35-45 minute classes had the highest achievement scores. Again, no significant difference was found between the average achievement scores for students in classes 46-50 minutes in length and students in classes 51 minutes or over.

Since all treatments were not present, an analysis of variance was not made for fifth-and sixth-semester students.

Classes that were 51 minutes and over in length had 10.2 per cent meeting Federal Civil Service requirements as indicated in Table 39. Classes which were 46-50 minutes in length had 9.9 per cent meeting these standards, and classes 35-45 minutes in length had 7.7 per cent. The highest per cent meeting Utah Employment Security standards again was the classification of classes 51 minutes or more in length, as shown in Table 40. They had 14.5 compared with 12.0 for classes 35-45 minutes and 9.5 per cent for classes 46-50 minutes in length.

Manuals or Electrics. As shown in Table 41, 98 first-semester junior high and senior high school students were typewriting on manual typewriters and 27 first-semester junior and senior high school students were typewriting on electrics. Even though the first semester students typewriting on electrics had a slightly higher average achievement score in each category, no significant difference was found at the .05 per cent level of significance. Fifty-three second-semester students were typewriting on electrics compared to 1,121 students typewriting on manuals. No significant difference was found in the gross words per minute rate. However, significant difference was found at the .01 per cent level of significance for the average number of errors made. Students typewriting on manual typewriters made an average of 9 errors compared with an average of 12 errors for students typewriting on electric typewriters.

A significant difference was found at the .05 per cent level for the average gross words minus errors rate. Students typewriting on manual typewriters had an average gross words minus errors rate of 31 compared to an average gross words minus errors rate of 27 for students typewriting on electric typewriters. A significant difference at the .01 level was found in the net words per minute rate. Again students typewriting on manual typewriters had the higher average rate. They had an average net words per minute rate of 23 compared to 16 for those typewriting on electric typewriters.

No significant differences were found in any of the achievement scores of third-semester students. A significant difference at the .05 level of significance was found for fourth-semester students for the average gross words per minute rate. Students typewriting on electrics had an average gross words per minute rate of 58 compared with an average gross words per minute rate of 54 for students typewriting on manual typewriters. No other significant differences were found in the average achievement scores of fourth-semester students. No significant differences were found for fifth-semester students typewriting on electric and manual typewriters. The only significant difference found for sixth-semester students was found in the average gross words per minute rate at the .05 per cent level of significance. Students typewriting on manual typewriters had an average gross words per minute rate of 58 compared to an average gross words per minute rate of 52 for students typewriting on electric typewriters.

Table 42 shows that students typewriting on electric typewriters had 11.9 per cent meeting Federal Civil Service standards compared with 9.3 per cent of the students typewriting on manual typewriters meeting these standards. The per cent of students typewriting on electric typewriters meeting Utah Employment Security standards, as indicated in Table 43, was 13.7 per cent compared with 10.5 per cent of those typewriting on manual typewriters.

Homework Assignments. As indicated in Table 44, a total of 80 of 1,634 students were given homework assignments. Since such a small number were given homework assignments and since all were second-semester students no analysis of variance was computed to determine the significance of the differences in the achievement of students having homework assignments and students who did not. In comparing the 80 second-semester students who had homework assignments with the 1,094 students in this same category who had no homework assignments, the students given the assignments had a lower average gross words per minute rate. The second-semester students with homework assignments had an average rate of 33 gross words per minute compared with an average of 41 gross words per minute for the second semester students who had no homework assignments. The students who had no homework assignments also had less average errors--9 compared to 10.

Table 45 reveals that 1.3 per cent of the 80 students given homework assignments met the Federal Civil Service requirements compared to 8.8 per cent of the second-semester students who had no homework. Five per cent of the students having homework assignments met the Utah Employment Security standards compared to 6.2 per cent of those who were in this same category who had no homework assignments as shown in Table 46.

Additional Instruction. Seventy-four of the junior high and senior high school students tested, as indicated in Table 47, stated they had additional typewriting instruction. Thirteen first-semester students had additional instruction with 112 who did not. The students who had additional instruction had an average gross words per minute rate of 36 with 11 errors compared to 30 with 12 errors for those who had none. The difference in the average gross words per minute rate was significant at the .05 per cent level of significance. However, no significant difference was found in the average errors made. A significant difference at the .05 per cent level of significance was also found for the average gross words minus errors, correct words per minute and net words per minute rates, with those having additional instruction scoring higher.

Thirty-nine second-semester students had additional typewriting instruction compared with 1,135 second-semester students who did not. A significant difference was found in the average gross words per minute rate at the .01 per cent level. Students who had additional typewriting instruction had a mean score of 45 compared with a mean score of 40 for those who had none. No significant difference was found in the average number of errors made. A significant difference was found at the .01 level in the average gross minus errors, the correct words per minute, and the net words per minute rates with those having additional typewriting instruction having the higher achievement scores. Only 7 third-semester students, 14 fourth-semester students, one fifth-semester student, and no sixth-semester students had additional typewriting instruction. There were no significant differences found in any of the average achievement scores for any of these semesters of typewriting instruction.

The number of students who met the Federal Civil Service standards is shown in Table 48. The students having additional instruction in typewriting had 12.2 per cent of the students meeting the Federal Civil Service standards compared with 8.7 per cent of the students meeting them who had no additional instruction. As indicated in Table 49, 14.1 per cent of those having additional instruction met the Utah Employment Security standards compared with 10.8 per cent of the students having no additional instruction who met these standards.

From the foregoing findings, it can be noted that significant differences have been found at the .05 and .01 per cent levels of significance when comparing the influence of various factors on the typewriting achievement of students in the secondary schools of the state of Utah. The number of students meeting Federal Civil Service standards and the Utah Employment Security standards was also listed for each factor considered.

# SUMMARY AND CONCLUSIONS

## Summary

The purpose of this study was to determine the skill of typewriting students in the secondary schools of the state of Utah as a function of the number of semesters of typewriting instruction. The skill attained by the students was then to be compared with employment standards to determine how many students were attaining an employable skill.

An extensive review of literature was made to determine requirements for beginning workers in typewriting and to determine the skills attained by typewriting students throughout the nation.

Next, a review was made of typewriting achievement tests; and the Students Typewriting Tests, Typewriting II-Second Semester, was selected as the test to be used in this study.

Typewriting students in both junior and senior high schools throughout the state of Utah were selected on a proportional, stratified random sample basis according to the size of school, and whether the school was a junior or senior high school. Tests were administered to 1,634 students. The students tested represented 853 junior high school students and 781 senior high school students.

In scoring the tests and analyzing the data, the range, mean, and standard deviation were calculated on each of the following: (1) total points on the tests, (2) gross words per minute, (3) the number of errors, (4) the gross words per minute minus the errors, (5) the correct words per minute, and (6) the net words per minute. An analysis of variance of this data was also made to determine the significance of the difference in the average achievement scores at the .05 and .01 per cent levels of significance.

The employment standards used as the basis of comparison with the skills attained by the students were the Federal Civil Service standards and the Utah Employment Security standards. For the Federal Civil Service standards, the minimum requirement of 40 gross words per minute with three errors or less was used. For the Utah Employment Security standards, 50 words per minute for students typewriting on manual typewriters and 55 words per minute for students typewriting on electric typewriters were used. The words per minute were determined by subtracting the errors from the total words typed. Seventy-three, or 8.6 per cent, of the 853 junior high school students met the Federal Civil Service standards; and 74, or 9.5 per cent, of the 781 senior high school students met these standards. Forty-seven, or 5.5 per cent of the junior high school students met the Utah Employment Security standards; and 134, or 17.2 per cent of the senior high school students met these standards. One should remember that achievement on the Students Typewriting Tests is at best a crude comparison with standards used for the Federal Civil Service examinations and the Utah Employment Security tests since the difficulty of copy, format divergencies, and other variations may have a significant influence on performance.

The skill achievement and number of students meeting the Federal Civil Service standards and the Utah Employment Security standards were also determined according to the school enrollment, the class enrollment, the length of the class period, whether students were typewriting on manual or electric typewriters, whether students had been given homework assignments, and whether the students had received additional typewriting instruction.

## Conclusions

Answers to each of the following questions can be considered as the conclusions reached as a result of this study:

1. What are the skills attained by students in the secondary schools of the state of Utah as a function of the number of semesters of typewriting instruction?

The following are the average gross words per minute and the average number of errors made by the students tested in the secondary schools of the state of Utah for semesters one through six of typewriting instruction.

A. First-semester students attained an average gross words per minute rate of 30.8 with an average of 12.2 errors.

B. Second-semester students attained an average of 40.7 gross words per minute with an average of 9.4 errors.

C. Third-semester students attained an average of 47.8 gross words per minute with an average of 8.1 errors.

D. Fourth-semester students attained an average of 54.7 gross words per minute with an average of 8.8 errors.

E. Fifth-semester students attained an average of 56.0 gross words per minute with an average of 8.1 errors.

F. Sixth-semester students attained an average of 53.5 gross words per minute with an average of 6.5 errors.

The semesters of typewriting instruction significantly affected the achievement scores of the students for semesters one through four. However, after a student had four semesters of typewriting instruction, there was no significant difference found in this study in the scores attained when students had additional semesters of typewriting instruction.

A significant difference was found between the achievement scores of junior and senior high school first-semester students, with the senior high school first-semester students having the highest scores. A significant difference was also found in the scores of the second-semester junior and senior high school students; however, for second-semester students, junior high school students had the better scores.

2. Are employment standards being met by students in the secondary schools of the state of Utah? If they are, at what level of typewriting instruction are they being met?

From the results of this study, it is concluded that a total of 147 students out of a total of 1,634 students, or 9.0 per cent, met the Federal Civil Service requirements. This comprised 73, or 8.6 per cent, of the junior high school students tested, and 74, or 9.5 per cent, of the senior high school students tested. A total of 179, or 11.1 per cent, of the 1,634 students tested met the Utah Employment Security standards. This comprised 45, or 5.5 per cent, of the junior high school students, and 134, or 17.2 per cent, of the senior high school students tested. No first-semester students tested in this study met the Federal Civil Service Requirements or the Utah Employment Security requirements. The highest per cent meeting these standards was at the fifth-semester level for the Federal Civil Service requirements and at the fourth-semester level for the Utah Employment Security requirements.

3. What is the influence of the grade level of the students?

The grade level of the students did not significantly affect the average gross words per minute rate. However, it did significantly affect the number of errors made, the average gross words minus errors and the average net words per minute rates of the students tested, with the eleventh and twelfth grade students having the highest achievement scores.

The only significant effect the grade level of the students had on the second-semester students was on the average number of errors made and the average net words per minute rate, with eighth-graders having the best achievement score at the second-semester level of typewriting instruction.

All treatments were not present for the other semesters of typewriting instruction so a determination of the affect of the grade level of the students on typewriting achievement could not be made.

4. What is the influence of the school enrollment?

All treatments were not present for the first-semester so a conclusion as to the influence of the school enrollment could not be made. School enrollment had a significant effect on all achievement scores. Schools with enrollments of 1,500-over had the best achievement scores. No significant difference was found between the achievement scores of students in schools with enrollments of 1,500-over and those with enrollments of 1,000-1,499 in the average number of errors made and in the net words per minute rate.

School enrollment had no significant effect on third semester students.

School enrollment had a significant effect on all the achievement scores of fourth-semester students except the number of errors, with students in schools with enrollments of 0-499 having the best achievement score.

All treatments were not present for the fifth- and sixth-semester students tested so the effect of the school enrollment on the students' achievement scores could not be determined.

5. What is the influence of the class enrollment?

The class enrollment had a significant effect on the achievement of first-semester students for all achievement scores except gross words per minute, with students in classes with enrollments of 41-over having the highest average achievement scores.

Class enrollment also had a significant effect on the achievement of second-semester students for all achievement scores. Students in classes of 21-30 students had the highest average gross words per minute rate, and students in classes of 31-40 had the lowest average number of errors.

Class enrollment significantly affected only the average number of errors and the average net words per minute achievement scores of fourth-semester students in classes with enrollments of 41-over having the best achievement scores.

All treatments were not present for third, fifth, or sixth-semester students, so the influence of class enrollment on these students could not be determined.

6. What is the influence of the length of the class period?

All treatments were not present for the first semester students.

The length of the class period significantly affected the average gross words per minute, the gross minus errors, and the correct words per minute rate of the second-semester students, with classes 46 minutes and over having the highest rate. No significant difference was found at the .05 per cent level of significance between class periods 46-50 minutes in length and those 51 or more minutes in length.

The length of the class period had no significant effect upon the third-semester students. The length of the class period significantly affected all achievement scores of fourth-semester students with students in classes 35 to 45 minutes in length having the best achievement scores. Again no significant difference was found between classes 46-50 minutes in length and those 51 minutes or over in length.

All treatments were not present for fifth- and sixth semester students.

7. What is the influence of whether the students are typewriting on manual or electric typewriters?

The kind of typewriter the students were typewriting on did not significantly affect the achievement scores of first-semester students. For second-semester students, the kind of typewriter used affected the number of errors made, the gross words minus errors and the net words per minute rates, with students typewriting on manual typewriters having the better achievement scores.

The kind of typewriter used had no significant affect on third-semester students. The gross words per minute rate of fourth-semester students and sixth-semester students was significantly affected by the kind of typewriter used, with students typewriting on electric typewriters having the better gross words per minute rate.

8. What is the influence of homework assignments?

Since such a small number of students were given homework assignments, no effort was made to determine statistically the influence of this factor.

9. What is the influence of additional typewriting instruction?

Additional typewriting instruction significantly affected all the achievement scores except errors of the first semester students, with those having additional instruction in typewriting having the best achievement scores. Second-semester students were also significantly affected by additional typewriting instruction on all achievement scores except errors. Those with additional instruction in typewriting had the best achievement rates. Additional instruction had no significant influence on third, fourth, fifth or sixth-semester students.

# RECOMMENDATIONS

Based on the results of this study the following recommendations are made:

1. The fifth and sixth semesters of typewriting instruction may be dropped from the typewriting curriculum.
2. Junior high students should be permitted to take two semesters of typewriting.
3. Typewriting classes may be 45 minutes in length without hampering typewriting achievement.
4. Classes may have enrollments of 41 or more students without hampering typewriting achievement.
5. Study should be repeated using copy comparable to employment tests.
6. Study should be extended to include production-type performance.
7. Study should be repeated in other states.
8. Study should be repeated in five years for comparison purposes.
9. Similar studies should be made in shorthand and bookkeeping.

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# APPENDIX A

## SCHOOLS PARTICIPATING IN STUDY

The following junior high schools of the state of Utah participated in this study:

Ashley Valley Junior High School, Uintah School District
Bear River Junior High School, Bear River School District
Bonneville Junior High School, Granite School District
Cedar City Junior High School, Iron School District
Churchill Junior High School, Granite School District
Granite Park Junior High School, Granite School District
Hillcrest Junior High School, Murray City School District
Hillside Junior High School, Salt Lake City School District
Irving Junior High School, Salt Lake City School District
Kaysville Junior High School, Davis School District
Lewiston Junior High School, Cache County School District
Lincoln Junior High School, Salt Lake City School District
Mt. Jordan Junior High School, Jordan School District
Price Junior High School, Carbon School District
South Cache Junior High School, Cache County School District
South Davis Junior High School, Davis School District
Southeast Junior High School, Salt Lake City School District
Spanish Fork Junior High School, Nebo School District
Sunset Junior High School, Davis School District
Valley Junior High School, Granite School District
Wasatch Junior High School, Granite School District
West Jordan Junior High School, Jordan School District

The following senior high schools of the state of Utah participated in this study:

Bonneville Senior High School, Weber School District
Dixie Senior High School, Washington School District
Monticello Senior High School, San Juan School District
Morgan Senior High School, Morgan School District
North Sanpete Senior High School, North Sanpete School District
Olympus Senior High School, Granite School District
Panguitch Senior High School, Garfield School District
Springville Senior High School, Nebo School District
Tabiona Senior High School, Duschesne School District
Tintic Senior High School, Tintic School District
Uintah Senior High School, Uintah School District
Wayne Senior High School, Wayne School District
West Senior High School, Salt Lake City School District

UNITED

STUDENT TYPEWRITING TESTS

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Copies may be obtained from:

"United Business Education Association
1201 Sixteenth Street, N.W. Washington, D.C."

## APPENDIX C

## TEACHER DATA SHEET

Please fill out one for each class test is administered to:

Name:_________________________ ID Number:__________ Test Date:___________

School:_______________________ ID Number:__________ Enrollment:__________

The following information pertains to the typewriting class being tested:

Number of tests administered:__________

Title of class used for testing:______________________________________

Number of semesters this class is offered:__________

Class enrollment:__________

Length of class period:__________

Number of days per week class meets:__________

Are homework assignments given? ____ Yes ____ No

## APPENDIX D

## STUDENT DATA SHEET

DO NOT BEGIN WRITING UNTIL YOU ARE DIRECTED TO DO SO.

Please Print:

Name:______________________________________ Test Number:____________
Last First Middle

Grade Level:__________ Sex:__________ __________ Semesters of typewriting instruction:__________
Male Female

Kind of typewriter used during test: __________ __________
Manual Electric

Have you taken any other typewriting classes in addition to those offered by your school, such as summer typewriting? ____ ____ If yes, please
Yes No
indicate the name of the class and the months of instruction:

______________________________ ______________________________
Name of Class Months of Instruction

### SUMMARY OF TEST RESULTS

| | Point Score |
|---|---|
| PART A - Time Writing (two, 5 minutes each), 10 minutes | |
| PART B - Business Letter with Corrections, 8 minutes | |
| PART C - Tabulation, 8 minutes | |
| PART D - Manuscript, 10 minutes | |
| TOTAL POINTS | |

__________ No. of gross words a minute __________

__________ Total number of errors __________

__________ Gross words minus errors __________

__________ Minimum productive rate __________

## APPENDIX E

## GENERAL INSTRUCTION SHEET

**School:**____________________ **Number of tests to be administered:**______

**(First Year:** _______ **1st Sem.** _______ **2nd Sem.** **Second Year:** _______ **3rd Sem.** _______ **4th Sem.)**

**Please read the following carefully and thoroughly:**

### Purpose of Test Administration:

The State Department of Education in cooperation with Utah State University is doing a study to assess the typewriting skills attained by students in the secondary schools of the state of Utah in relation to job entry requirements. Your school has been randomly selected as one of the schools to administer tests to typewriting students in an effort to ascertain their skill achievement.

### Test to be Administered:

After a review of several different typewriting tests, the Students Typewriting Tests, Semester II, sponsored by the National Business Education Association, was selected to be administered to nearly 2,200 junior and senior typewriting students randomly selected throughout the state of Utah. This test requires approximately 45 minutes to administer and consists of the following four parts:

Part A - Timed Writing (two, 5 minutes each), 10 minutes.
Part B - Business Letter with Corrections, 8 minutes.
Part C - Tabulation, 8 minutes.
Part D - Manuscript, 10 minutes.

### Selection of Class to be Tested:

The number of tests to be administered is indicated at the top of this page. If your school offers more than one class in typewriting in the category to be tested, place the hour of each class on separate sheets of paper in a hat and randomly draw the class to be tested. If more than one category is to be tested, please select one class from each category in the same way. (For example, if both a first year and a second year typewriting class are to be tested, first put the hours of the first year classes on separate sheets of paper in a hat and randomly select one. Then put the hours on separate sheets of paper of the second year classes in a hat, and randomly select one.)

### Selection of Students to be Tested:

After the selection of the class to be tested has been made, put the names of each student in this class on separate sheets of paper in a hat and draw out the names as indicated by the number of tests to be administered.

Date of Test Administration:

The test should be administered during one class period on either Tuesday, May 2, Wednesday, May 3, or Thursday, May 4, 1967. (Please do not administer this test on Monday or Friday of this week.)

Materials and Supplies Needed:

The students will need to have the following materials and supplies for the test: 10 sheets of typewriting paper, 1 sheet of carbon paper, 2 envelopes, and erasing materials.

Teacher Data Sheet:

Prior to the administration of the test, each teacher administering the tests should fill out a Teacher Data Sheet. One form should be filled out for each class to which the tests will be administered.

Miscellaneous Instructions:

It goes without saying that the teacher is instrumental in creating a relaxed testing atmosphere. Do not seem to rush the students, but point out to them the importance of using the time effectively. The Following procedures are recommended:

1. Provide time for reading instruction; clarify, but do not give problem-solving hints.
2. Time each part separately--with the exception of the two, 5-minute time writings, the time indicated includes planning, machine adjustment, and so on, but not the reading of instructions.
3. Encourage the students to typewrite the full time allotted to the problem. Some students will complete each problem two or more times.

Emphasize that erasing is not to be done on the timed writings; but in all other parts of the test, errors which are neatly corrected will not be penalized. For this reason, the student should proofread each problem as soon as he finishes typewriting it. An error is any actual mistake in the typewriting or any deviation from the copy. Not more than one error will be charged against any one word.

In the case of some aspects of typewriting, good usage includes more than one correct way of doing certain things (e.g., depth of paragraph, indentation of a letter, style of letter, underscoring of spaces between words, and so on). If the test instructions have not indicated specifically what the student is to do, students may use any solution which is in accordance with the textbook you are using or your classroom teaching. If, however, the instructions are specific, the student should follow them regardless of whether they differ from what he is accustomed to, just as in the office he might be asked to typewrite material in an arrangement different from the arrangement he used in school.

For the most part, the student has been left free to select his style preference for letter arrangement and punctuation since the textbooks are not uniform in the terminology they use to describe these aspects.

Also, the student is not hampered in using any tabulation method of his choice; whatever requirements are included in the directions applying to tabulation, they do not affect the method that may be used to determine placement.

Dictionaries should be available for use during the test.

Scoring of Tests:

All tests will be scored at Utah State University. Neither the students nor teachers will be required to correct any part of the test. Results will be available in early fall of this year.

# APPENDIX F

## ADMINISTRATION OF THE TEST

1. While passing out the tests to the students who were randomly selected in the class, allow the students to be typing a warm-up practice from material other than test copy.

2. After each student has received a copy of the test, make sure each student has the materials needed to take the test--10 sheets of typewriting paper, 1 sheet of carbon paper, 2 envelopes, and erasing materials.

3. Instruct students to fill out Student Data Sheet as follows:
   A. Name--last name first.
   B. Grade Level--7th, 8th, 9th, 10th, 11th or 12th.
   C. Sex.
   D. Semesters of typewriting instruction--total semesters each student has taken typewriting in the secondary schools during the regular school year.
   E. Kind of typewriter used during test--manual or electric.
   F. Additional typewriting instruction--if a student has taken any special typewriting classes in addition to those taken during the regular school year, they should mark "yes" and indicate the title of the course and the months of instruction. (For example, a student may have taken a summer typewriting course for one month.)
   G. Summary of test results--no marks should be made on this part of the data sheet. This is for scoring purposes only.

4. Read word-for-word the following instructions:

   This test consists of four parts: Part A, a 5-minute timed writing to be typewritten twice; Part B, a business letter with corrections indicated; Part C, a brief tabulation; and Part D, a portion of a manuscript.

   A. Materials and supplies needed are: 10 sheets of typewriting paper, 1 sheet of carbon paper, 2 envelopes, and erasing materials.
   B. Use a separate sheet of paper for each problem.
   C. Typewrite your name in the upper right-hand corner of each sheet before the test begins. (Stop at this point and allow your students time to do this.)
   D. When you complete a given part of the test, repeat that part from the beginning until time is called. A problem incomplete because time is called will receive partial credit.
   E. Erasing is not permitted on the timed writings. Proofread each of the other parts of the test before removing the paper from the machine and correct errors; neatly corrected errors will not be penalized. Bonus points may be earned by following directions carefully and arranging material correctly.
   F. Do not typewrite the numbers shown in the right-hand margins. They

are used for scoring purposes.

5. Now have students turn to Part A and read to them the following instructions:

   "Part A will consist of two, 5-minute timed writings. Use a 70-space line, a 5-space paragraph indention, and double spacing. If you complete the copy before time is called, start again at the beginning. Do not erase on this part of the test." (Allow time at this point for students to get ready for the timed writings.)

6. Allow two minutes of relaxation between the two timed writings.

7. When time is called on the second timed writing, have the students set these two timings aside and turn to Part B. Read to them the following instructions:

   "Part B consists of a Business Letter with Corrections. You will have 8 minutes for this part of the test. Typewrite this letter single spaced in an attractive style, making the corrections shown. Prepare one carbon copy; correct any errors you may make on both the original and the carbon copy. Assume that you have a printed letterhead of approximately two-inch depth. Date the letter today and use your initials in the reference notation. (P) indicates paragraph. Address an envelope, but assume that the return address is printed. If you finish before time is called, begin typing the letter a second time."

8. When time is called for Part B, have students turn to Part C and read to them the following instructions:

   "Part C consists of a tabulation problem. You may use any tabulation method of your choice in setting up this problem. Center the material attractively on a full page with more space in the margins than between columns. Triple space (2 blank lines) after the main heading and double space (1 blank line) after column headings. Double space after each two company names, as shown. Typewrite each number on the line with the second company name in each group. You will have 8 minutes for this problem."

9. After time is called for Part C, have students turn to Part D and read to them the following instructions:

   "Part D consists of a manuscript. You will have 10 minutes to type this problem. This is the third page of a report entitled "Duties of National Officers, Future Business Leaders of America." It is to be unbound; therefore, arrange the material with equal side margins of 1 1/2 inches and top and bottom margins of 1 inch. Use the vertical spacing shown or indicated; single space the copy with double spacing between items numbered with Arabic figures (1, 2, etc.). Typewrite a running head (the title of the report) at the top of the page, starting at the left margin and the page number flush with the right margin."

10. Following the completion of Part D, instruct each student to assemble their problems and staple them together in the following order:

    On top should be the Student Data Sheet, next the test, next the two 5-minute timed writings, the business letter, the tabulation problem, and the manuscript.

11. Thank you for your cooperation and assistance in administering these tests.

# APPENDIX G

## SCORING DIRECTIONS

Directions to Teachers

The syllabic intensity of the timed writing is 1.40

### Scoring Directions

The scoring throughout the test is on a point basis with no maximum possibility; the points on each part will be dependent on the quantity and quality of the work the student completes within the time allowance.

Part A--Timed Writing (two, 5 minutes each), 10 minutes
Compute the gross words a minute (total words - 5 minutes) for each timed writing. Words in an uncompleted line may be measured with an elite type scale ruler. Determine the point score for each writing from the attached "Chart for Determining Scores on Timed Writings." The higher of these two scores will be the point score earned for this part of the test.

Part B--Business Letter with Corrections, 8 minutes
Each line of test copy correctly typewritten, 2 points*
Bonus 5 points for satisfactory placement of the letter**
Bonus 5 points for correct letter style and punctuation**
Deduct 5 points if carbon copy is missing.
If an error is corrected on the original but not on the carbon copy, do not count that line as a correct line.
Bonus 3 points for correctly typewritten envelope

Part C--Tabulation, 8 minutes
Each line of test copy correctly typewritten and aligned, 2 points*
Bonus 3 points for satisfactory placement**
Bonus 3 points for following directions exactly**

Part D--Report, 10 minutes
Each line of test copy correctly typewritten, 1 point*
Bonus 3 points for using the margins specified***
Bonus 5 points for correct vertical spacing throughout, according to the directions***

*A line is considered to be "correctly typewritten" if it is without typographical errors (misstruck letters, wrong spacing after punctuation, and the like). In the case of an incomplete copy of a problem, treat the last line as a full line if it is more than half typewritten; if started but less than half completed, give half credit for the line.

**A specified bonus is to be given only if the problem is complete and given only one time on each problem regardless of how many copies are finished.

***The bonus points on Part D may be earned if the copy is completed through line 22.

As an example, let us say Student A

--typewrites at a rate that produces a score of 38 (refer to the "Chart for Determining Scores on Timed Writings") on the first timed writing and a score of 45 on the second. (Point Score 45)

--typewrites the letter and envelope once and starts again. In the complete copy he did not change the word now as marked in "line 8" and he has a typewriting error in another line. The letter is well placed, style is correct, and punctuation also except that he did not put a comma between Tulsa and Oklahoma in the address. (14 correct lines x 2, plus 5 for placement, and plus 3 for envelope). The fractional portion includes only the date and the name (1 point). (Point Score 37)

--typewrites the table one plus times. The complete copy is correct in all respects, but the space in the margins and between columns is equal. (24 for lines plus 3 for placement, but the other bonus is not given because he failed to follow directions). The second table ends with Hudson; there is an error in the title. (9 for lines) (Point Score 36)

--typewrites the report through line 30; margins and spacing are correct except that only one blank line is left above the side head A. GENERAL DUTIES. There are two typewriting errors in one line. (29 correct lines plus 3 for margins) (Point Score 32)

## APPENDIX H

## CHART FOR DETERMINING TIMED WRITING SCORES

| | ERRORS | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gross Words a Minute | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 80 | 80 | 74 | 68 | 64 | 59 | 56 | 53 | 50 | 47 | 45 | 43 | 41 | 39 | 38 | 36 | 35 | 34 | 32 | 31 | 30 | 29 |
| 79 | 79 | 73 | 67 | 63 | 59 | 55 | 52 | 49 | 47 | 44 | 42 | 40 | 39 | 37 | 36 | 34 | 33 | 32 | 31 | 30 | 29 |
| 78 | 78 | 72 | 67 | 62 | 58 | 54 | 51 | 49 | 46 | 44 | 42 | 40 | 38 | 37 | 35 | 34 | 33 | 32 | 31 | 30 | 29 |
| 77 | 77 | 71 | 66 | 61 | 57 | 54 | 51 | 48 | 46 | 43 | 41 | 39 | 38 | 36 | 35 | 34 | 32 | 31 | 30 | 29 | 28 |
| 76 | 76 | 70 | 65 | 60 | 56 | 53 | 50 | 47 | 45 | 43 | 41 | 39 | 37 | 36 | 34 | 33 | 32 | 31 | 30 | 29 | 28 |
| 75 | 75 | 69 | 64 | 60 | 56 | 52 | 49 | 47 | 44 | 42 | 40 | 38 | 37 | 35 | 34 | 33 | 31 | 30 | 29 | 28 | 27 |
| 74 | 74 | 68 | 63 | 59 | 55 | 52 | 49 | 46 | 44 | 42 | 40 | 38 | 36 | 35 | 33 | 32 | 31 | 30 | 29 | 28 | 27 |
| 73 | 73 | 67 | 62 | 58 | 54 | 51 | 48 | 45 | 43 | 41 | 39 | 37 | 36 | 34 | 33 | 32 | 31 | 30 | 29 | 28 | 27 |
| 72 | 72 | 66 | 61 | 57 | 54 | 50 | 47 | 45 | 43 | 40 | 39 | 37 | 35 | 34 | 33 | 31 | 30 | 29 | 28 | 27 | 26 |
| 71 | 71 | 65 | 61 | 56 | 53 | 50 | 47 | 44 | 42 | 40 | 38 | 36 | 35 | 33 | 32 | 31 | 30 | 29 | 28 | 27 | 26 |
| 70 | 70 | 64 | 60 | 56 | 52 | 49 | 46 | 44 | 41 | 39 | 38 | 36 | 34 | 33 | 32 | 30 | 29 | 28 | 27 | 26 | 26 |
| 69 | 69 | 64 | 59 | 55 | 51 | 48 | 45 | 43 | 41 | 39 | 37 | 35 | 34 | 32 | 31 | 30 | 29 | 28 | 27 | 26 | 25 |
| 68 | 68 | 63 | 58 | 54 | 51 | 47 | 45 | 42 | 40 | 38 | 37 | 35 | 33 | 32 | 31 | 30 | 28 | 28 | 27 | 26 | 25 |
| 67 | 67 | 62 | 57 | 53 | 50 | 47 | 44 | 42 | 40 | 38 | 36 | 34 | 33 | 32 | 30 | 29 | 28 | 27 | 26 | 25 | 24 |
| 66 | 66 | 61 | 56 | 52 | 49 | 46 | 43 | 41 | 39 | 37 | 35 | 34 | 33 | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 |
| 65 | 65 | 60 | 55 | 52 | 48 | 45 | 43 | 40 | 38 | 37 | 35 | 33 | 32 | 31 | 29 | 28 | 27 | 26 | 25 | 25 | 24 |
| 64 | 64 | 59 | 55 | 51 | 48 | 45 | 42 | 40 | 38 | 36 | 34 | 33 | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 |
| 63 | 63 | 58 | 54 | 50 | 47 | 44 | 41 | 39 | 37 | 35 | 34 | 32 | 31 | 30 | 29 | 27 | 26 | 26 | 25 | 24 | 23 |
| 62 | 62 | 57 | 53 | 49 | 46 | 43 | 41 | 39 | 37 | 35 | 33 | 32 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 23 |
| 61 | 61 | 56 | 52 | 48 | 45 | 43 | 40 | 38 | 36 | 34 | 33 | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 |
| 60 | 60 | 55 | 51 | 48 | 45 | 42 | 40 | 37 | 35 | 34 | 32 | 31 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 23 | 22 |
| 59 | 59 | 54 | 50 | 47 | 44 | 41 | 39 | 37 | 35 | 33 | 32 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 22 |
| 58 | 58 | 53 | 49 | 46 | 43 | 40 | 38 | 36 | 34 | 33 | 31 | 30 | 28 | 27 | 26 | 25 | 24 | 23 | 23 | 22 | 21 |
| 57 | 57 | 52 | 49 | 45 | 42 | 40 | 38 | 36 | 34 | 32 | 31 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 22 | 21 |
| 56 | 56 | 52 | 48 | 44 | 42 | 38 | 37 | 35 | 33 | 31 | 30 | 29 | 27 | 26 | 25 | 24 | 23 | 23 | 22 | 21 | 21 |
| 55 | 55 | 51 | 47 | 44 | 41 | 38 | 36 | 34 | 32 | 31 | 30 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 22 | 21 | 20 |
| 54 | 54 | 50 | 46 | 43 | 40 | 38 | 36 | 34 | 32 | 30 | 29 | 28 | 27 | 25 | 24 | 24 | 23 | 22 | 21 | 20 | 20 |
| 53 | 53 | 49 | 45 | 42 | 40 | 37 | 35 | 33 | 31 | 30 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 21 | 20 | 19 |
| 52 | 52 | 48 | 44 | 41 | 39 | 36 | 34 | 32 | 31 | 29 | 28 | 27 | 26 | 24 | 24 | 23 | 22 | 21 | 20 | 20 | 19 |
| 51 | 51 | 47 | 44 | 41 | 38 | 36 | 34 | 32 | 30 | 29 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 21 | 20 | 19 | 19 |

Scores should be determined from this chart as follows: For a student who wrote 60 gross words a minute with 3 errors, locate the column marked "3" under "Errors." Move down that column to the line opposite the one indicating "60" for the "Gross Words a Minute." The score "48" represents the

"Mailable Words a Minute" presented in the nearest whole number, and is the number of points the student is to receive on the timed writing. Students who make more than 20 errors on the timed writing will receive no points for this part of the test.

*This chart is an adaptation of the Scoring Chart for Determining Mailable Words a Minute on Straight-Copy Five-minute Timed Writings (without carbon copy) for second-semester high school typewriting presented by Irol Whitmore Balsley in the publication of the Department of Business and Economic Research, School of Business Administration, Louisiana Polytechnic Institute, Ruston, Louisiana, entitled "A Study of the Validity of Some Methods of Measuring Straight-Copy Typewriting Skill."

| Gross Words a Minute | ERRORS | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 50 | 50 | 46 | 43 | 40 | 37 | 35 | 33 | 31 | 30 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 20 | 19 | 18 |
| 49 | 49 | 45 | 42 | 40 | 36 | 34 | 32 | 31 | 29 | 28 | 26 | 25 | 24 | 23 | 22 | 21 | 21 | 20 | 19 | 19 | 18 |
| 48 | 48 | 44 | 41 | 38 | 36 | 34 | 32 | 30 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 19 | 18 | 18 |
| 47 | 47 | 43 | 40 | 37 | 35 | 33 | 31 | 29 | 28 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 20 | 19 | 18 | 18 | 17 |
| 46 | 46 | 42 | 39 | 37 | 34 | 32 | 30 | 29 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 19 | 18 | 17 | 17 |
| 45 | 45 | 41 | 38 | 36 | 33 | 31 | 30 | 28 | 27 | 25 | 24 | 23 | 22 | 21 | 20 | 20 | 19 | 18 | 18 | 17 | 16 |
| 44 | 44 | 41 | 38 | 35 | 33 | 31 | 29 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 18 | 17 | 17 | 16 |
| 43 | 43 | 40 | 37 | 34 | 32 | 30 | 28 | 27 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 19 | 18 | 17 | 17 | 16 | 16 |
| 42 | 42 | 39 | 36 | 33 | 31 | 29 | 28 | 26 | 25 | 23 | 23 | 22 | 21 | 20 | 19 | 18 | 18 | 17 | 16 | 16 | 15 |
| 41 | 41 | 38 | 35 | 33 | 30 | 29 | 27 | 26 | 24 | 23 | 22 | 21 | 20 | 19 | 19 | 18 | 17 | 17 | 16 | 16 | 15 |
| 40 | 40 | 37 | 34 | 32 | 30 | 28 | 26 | 25 | 24 | 23 | 21 | 21 | 20 | 19 | 18 | 17 | 17 | 16 | 16 | 15 | 15 |
| 39 | 39 | 36 | 33 | 31 | 29 | 27 | 26 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 18 | 17 | 16 | 16 | 15 | 15 | 14 |
| 38 | 38 | 35 | 32 | 30 | 28 | 27 | 25 | 24 | 22 | 21 | 20 | 19 | 19 | 18 | 17 | 17 | 16 | 15 | 15 | 14 | 14 |
| 37 | 37 | 34 | 32 | 29 | 28 | 26 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 17 | 16 | 16 | 15 | 14 | 14 | 14 |
| 36 | 36 | 33 | 31 | 29 | 27 | 25 | 24 | 22 | 21 | 20 | 19 | 18 | 18 | 17 | 16 | 16 | 15 | 15 | 14 | 14 | 13 |
| 35 | 35 | 32 | 30 | 28 | 26 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 | 16 | 15 | 15 | 14 | 14 | 13 | 13 |
| 34 | 34 | 31 | 29 | 27 | 25 | 24 | 22 | 21 | 20 | 19 | 18 | 17 | 17 | 16 | 15 | 15 | 14 | 14 | 13 | 13 | 12 |
| 33 | 33 | 30 | 28 | 26 | 25 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 | 16 | 15 | 14 | 14 | 13 | 13 | 13 | 12 |
| 32 | 32 | 29 | 27 | 25 | 24 | 22 | 21 | 20 | 19 | 18 | 17 | 16 | 16 | 15 | 15 | 14 | 13 | 13 | 13 | 12 | 12 |
| 31 | 31 | 29 | 26 | 25 | 23 | 22 | 20 | 19 | 18 | 17 | 17 | 16 | 15 | 15 | 14 | 14 | 13 | 13 | 12 | 12 | 11 |
| 30 | 30 | 28 | 26 | 24 | 22 | 21 | 20 | 19 | 18 | 17 | 16 | 15 | 15 | 14 | 14 | 13 | 13 | 12 | 12 | 11 | 11 |
| 29 | 29 | 27 | 25 | 23 | 22 | 20 | 19 | 18 | 17 | 16 | 16 | 15 | 14 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 11 |
| 28 | 28 | 26 | 24 | 22 | 21 | 20 | 18 | 17 | 17 | 16 | 15 | 14 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 11 | 10 |
| 27 | 27 | 25 | 23 | 21 | 20 | 19 | 18 | 17 | 16 | 15 | 15 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 11 | 10 | 10 |
| 26 | 26 | 24 | 22 | 21 | 19 | 18 | 17 | 16 | 15 | 15 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 11 | 10 | 10 | 10 |
| 25 | 25 | 23 | 22 | 20 | 19 | 17 | 16 | 16 | 15 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 11 | 10 | 10 | 9 | 9 |
| 24 | 24 | 22 | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 14 | 13 | 12 | 12 | 11 | 11 | 10 | 10 | 10 | 9 | 9 | 9 |
| 23 | 23 | 21 | 20 | 18 | 17 | 16 | 15 | 14 | 14 | 13 | 12 | 12 | 11 | 11 | 10 | 10 | 10 | 9 | 9 | 9 | 8 |
| 22 | 22 | 20 | 19 | 18 | 16 | 15 | 15 | 14 | 13 | 12 | 12 | 11 | 11 | 10 | 10 | 10 | 9 | 9 | 9 | 8 | 8 |
| 21 | 21 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 12 | 12 | 11 | 11 | 10 | 10 | 10 | 9 | 9 | 9 | 8 | 8 | 8 |

| Gross Words a Minute | ERRORS | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 20 | 20 | 19 | 17 | 16 | 15 | 14 | 13 | 12 | 12 | 11 | 11 | 10 | 10 | 9 | 9 | 9 | 8 | 8 | 8 | 8 | 7 |
| 19 | 19 | 17 | 16 | 15 | 14 | 13 | 13 | 12 | 11 | 11 | 10 | 10 | 9 | 9 | 9 | 8 | 8 | 8 | 7 | 7 | 7 |
| 18 | 18 | 17 | 15 | 14 | 13 | 13 | 12 | 11 | 11 | 10 | 10 | 9 | 9 | 9 | 8 | 8 | 8 | 7 | 7 | 7 | 7 |
| 17 | 17 | 17 | 14 | 14 | 13 | 12 | 11 | 11 | 10 | 10 | 9 | 9 | 8 | 8 | 8 | 7 | 7 | 7 | 7 | 6 | 6 |
| 16 | 16 | 16 | 14 | 13 | 12 | 11 | 11 | 10 | 9 | 9 | 9 | 8 | 8 | 8 | 7 | 7 | 7 | 7 | 6 | 6 | 6 |
| 15 | 15 | 14 | 13 | 12 | 11 | 11 | 10 | 9 | 9 | 8 | 8 | 8 | 7 | 7 | 7 | 7 | 6 | 6 | 6 | 6 | 6 |
| 14 | 14 | 13 | 12 | 11 | 10 | 10 | 9 | 9 | 8 | 8 | 8 | 7 | 7 | 7 | 6 | 6 | 6 | 6 | 6 | 5 | 5 |
| 13 | 13 | 12 | 11 | 10 | 10 | 9 | 9 | 8 | 8 | 7 | 7 | 7 | 6 | 6 | 6 | 6 | 5 | 5 | 5 | 5 | 5 |
| 12 | 12 | 11 | 10 | 10 | 9 | 9 | 8 | 8 | 7 | 7 | 7 | 6 | 6 | 6 | 5 | 5 | 5 | 5 | 5 | 5 | 4 |
| 11 | 11 | 10 | 10 | 9 | 8 | 8 | 7 | 7 | 7 | 6 | 6 | 6 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 4 |

## APPENDIX I

## NUMBER OF TESTS TO BE ADMINISTERED IN EACH GROUP OF JUNIOR HIGH SCHOOLS

Total Tests to be Administered: 1,132

| Group | Sample | % of Total Sample | % of Total Tests | Tests to be Administered |
|---|---|---|---|---|
| 0-499 | 2 | 8 | 8 | 91 |
| 500-999 | 18 | 69 | 69 | 781 |
| 1,000-over | 6 | 23 | 23 | 260 |
|  | 26 | 100 | 100 | 1,132 |

## APPENDIX J

## NUMBER OF TESTS TO BE ADMINISTERED IN EACH JUNIOR HIGH SCHOOL

| School | Total Type Enrollment | % of Total | Tests to be Administered |
|---|---|---|---|
| Group: 0-499<br>Sample: 2<br>Total Tests: 91 | | | |
| 1 | 66 | 52 | 47 |
| 2 | 60 | 48 | 44 |
| | 126 | 100 | 91 |
| Group: 500-999<br>Sample: 18<br>Total Tests: 781 | | | |
| 3 | 241 | 7 | 55 |
| 4 | 183 | 5 | 40 |
| 5 | 186 | 5 | 40 |
| 6 | 204 | 6 | 48 |
| 7 | 140 | 4 | 31 |
| 8 | 190 | 6 | 48 |
| 9 | 180 | 5 | 40 |
| 10 | 250 | 7 | 55 |
| 11 | 120 | 3 | 24 |
| 12 | 198 | 6 | 48 |
| 13 | 180 | 5 | 40 |
| 14 | 219 | 6 | 48 |
| 15 | 185 | 5 | 40 |
| 16 | 180 | 5 | 40 |
| 17 | 190 | 6 | 48 |
| 18 | 160 | 5 | 40 |
| 19 | 216 | 6 | 48 |
| 20 | 220 | 6 | 48 |
| | 3,442 | 100 | 781 |
| Group: 1,00-over<br>Sample: 6<br>Tests: 260 | | | |
| 21 | 200 | 13 | 34 |
| 22 | 365 | 24 | 63 |
| 23 | 251 | 17 | 44 |
| 24 | 250 | 17 | 44 |
| 25 | 210 | 14 | 36 |
| 26 | 230 | 15 | 39 |
| | 1,506 | 100 | 260 |

## APPENDIX K

## SELECTION OF SENIOR HIGH SCHOOL SAMPLE

| Group | Total Enrollment | Per Cent of Total | Number of Schools | Sample | Total Type Enrollment |
|---|---|---|---|---|---|
| 0-499 | 10,635 | 19 | 42 | 8 | 3,201 |
| 500-999 | 10,476 | 18 | 15 | 3 | 2,709 |
| 1,000-1,499 | 14,312 | 25 | 12 | 3 | 2,723 |
| 1,500-over | 21,667 | 38 | 11 | 3 | 2,007 |
|  | 57,090 | 100 | 81 | 17 | 10,640 |

## APPENDIX L

## NUMBER OF TESTS TO BE ADMINISTERED IN EACH GROUP OF SENIOR HIGH SCHOOLS

| Group | Sample | % of Total Sample | % of Total Tests | Tests to be Administered |
|---|---|---|---|---|
| 0-499 | 8 | 47 | 47 | 500 |
| 500-999 | 3 | 18 | 18 | 188 |
| 1,000-1,499 | 3 | 18 | 18 | 188 |
| 1,500-over | 3 | 18 | 18 | 188 |
|  | 17 | 100 | 100 | 1,064 |

Total Tests to be administered: 1,064

# APPENDIX M

## NUMBER OF TESTS TO BE ADMINISTERED IN EACH SENIOR HIGH SCHOOL

| School | Total Type Enrollment | % of Total | Tests to be Administered |
|---|---|---|---|
| Group: 0-499<br>Sample: 8<br>Tests: 500 | | | |
| 27 | 36 | 7 | 35 |
| 28 | 78 | 15 | 75 |
| 29 | 115 | 22 | 110 |
| 30 | 122 | 23 | 115 |
| 31 | 29 | 6 | 30 |
| 32 | 25 | 5 | 25 |
| 33 | 35 | 7 | 35 |
| 34 | 79 | 15 | 75 |
| | 519 | 100 | 500 |
| Group: 500-999<br>Sample: 3<br>Tests: 188 | | | |
| 35 | 272 | 49 | 92 |
| 36 | 106 | 19 | 36 |
| 37 | 180 | 32 | 60 |
| | 558 | 100 | 188 |
| Group: 1,000-1,499<br>Sample: 3<br>Tests: 188 | | | |
| 38 | 218 | 21 | 39 |
| 39 | 595 | 59 | 111 |
| 40 | 204 | 20 | 38 |
| | 1,017 | 100 | 188 |
| Group: 1,500-over<br>Sample: 3<br>Tests: 188 | | | |
| 41 | 320 | 25 | 47 |
| 42 | 399 | 32 | 60 |
| 43 | 533 | 43 | 81 |
| | 1,252 | 100 | 188 |

# APPENDIX N

Students' scores on Students Typewriting Tests as a function of the number of semesters of typewriting instruction

| Semesters of Instruction | Junior High Schools | | | | Senior High Schools | | | | Total | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Range | Mean | SD | Number | Range | Mean | SD | Number | Range | Mean | SD |
| 1 | 106 | 0-113 | 43 | 46.0 | 19 | 40-110 | 71 | 23.2 | 125 | 0-113 | 47.5 | |
| 2 | 742 | 0-194 | 82 | 90.1 | 432 | 1-217 | 74 | 83.2 | 1,178 | 1-390 | 80.2 | |
| 3 | 2 | 78-86 | 82 | 5.7 | 50 | 34-146 | 98 | 86.8 | 52 | 34-146 | 97.5 | |
| 4 | 3 | 71-82 | 78 | 6.1 | 245 | 13-287 | 123 | 133.6 | 248 | 13-287 | 123.4 | |
| 5 | 0 | | | | 31 | 26-171 | 115 | 100.4 | 31 | 26-171 | 115.1 | |
| 6 | 0 | | | | 4 | 90-137 | 119 | 21.3 | 4 | 90-137 | 119.2 | |

Table 3. Comparison of average scores of Utah secondary school students on Students Typewriting Tests with national norms for Typewriting II--Second Semester Tests.

| Semesters of Instruction | Junior High Schools |  |  | Senior High Schools |  |  | Combined |  |  |
|---|---|---|---|---|---|---|---|---|---|
|  | Number | Average | National Average | Number | Average | National Average | Number | Average | National Average |
| 1 | 106 | 43 | 97 | 19 | 71 | 97 | 125 | 47.5 | 97 |
| 2 | 742 | 82 | 97 | 432 | 74 | 97 | 1,178 | 80.2 | 97 |
| 3 | 2 | 82 | 97 | 50 | 98 | 97 | 52 | 97.5 | 97 |
| 4 | 3 | 78 | 97 | 245 | 123 | 97 | 248 | 123.4 | 97 |
| 5 | 0 | 0 | 97 | 31 | 115 | 97 | 31 | 115.1 | 97 |
| 6 | 0 | 0 | 97 | 4 | 119 | 97 | 4 | 119.2 | 97 |

Table 4. Mean achievement scores of all Utah secondary school students tested on Students Typewriting Tests as a function of the number of semesters of instruction.

| Semester | Gross Words Per Minute | Errors | Gross Minus Errors | Correct Words Per Minute | Net Words Per Minute |
|---|---|---|---|---|---|
| 1 | 30.8 | 12.2 | 18.9 | 28.1 | 10.6 |
| 2 | 40.7 | 9.4 | 31.4 | 38.7 | 23.1 |
| 3 | 47.8 | 8.1 | 39.3 | 46.2 | 31.8 |
| 4 | 54.7 | 8.8 | 46.0 | 52.7 | 37.6 |
| 5 | 56.0 | 8.1 | 47.9 | 54.5 | 41.4 |
| 6 | 53.5 | 6.5 | 47.0 | 51.7 | 40.5 |

|  | 1 | 2 | 3 | 4 | 5 | 6 |  | 1 | 2 | 3 | 4 | 5 | 6 |  | 1 | 2 | 3 | 4 | 5 | 6 |  | 1 | 2 | 3 | 4 | 5 | 6 |  | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 |  | A | A | A | A | A | 1 |  | A | A | A | A | A | 1 |  | A | A | A | A | A | 1 |  | A | A | A | A | A | 1 |  | A | A | A | A | A |
| 2 |  |  | A | A | A | A | 2 |  |  | N | N | N | N | 2 |  |  | A | A | A | A | 2 |  |  | A | A | A | A | 2 |  |  | A | A | A | A |
| 3 |  |  |  | A | A | A | 3 |  |  |  | N | N | N | 3 |  |  |  | A | A | A | 3 |  |  |  | A | A | A | 3 |  |  |  | A | A | A |
| 4 |  |  |  |  | N | N | 4 |  |  |  |  | N | N | 4 |  |  |  |  | N | N | 4 |  |  |  |  | N | N | 4 |  |  |  |  | N | N |
| 5 |  |  |  |  |  | N | 5 |  |  |  |  |  | N | 5 |  |  |  |  |  | N | 5 |  |  |  |  |  | N | 5 |  |  |  |  |  | N |
| 6 |  |  |  |  |  |  | 6 |  |  |  |  |  |  | 6 |  |  |  |  |  |  | 6 |  |  |  |  |  |  | 6 |  |  |  |  |  |  |

A = Difference is significant at .01 per cent level of significance.
B = Difference is significant at .05 per cent level of significance.
N = No significant difference at .05 per cent level of significance was found.

Table 5. Skill achievement of junior high students on Students Typewriting Tests as a function of the number of semesters of instruction

|  |  | Gross Words Per Minute |  |  | Errors |  |  | Gross Minus Errors |  |  | Correct Words Per Minute |  |  | Net Words Per Minute |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Semesters | Number of Students | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD |
| 1 | 106 | 0-50 | 30.0 | 10.5 | 0-32 | 13.0 | 8.8 | 0-35 | 16.0 | 9.7 | 0-47 | 26.0 | 10.1 | 0-20 | 8.0 | 8.4 |
| 2 | 742 | 8-66 | 40.0 | 10.6 | 0-22 | 8.0** | 5.6 | 0-60 | 32.0** | 12.1 | 0-64 | 38.0 | 10.9 | 0-40 | 24.0** | 13.8 |
| 3 | 2 | 28-45 | 36.0 | 12.0 | 0-9 | 4.0 | 6.4 | 28-36 | 32.0 | 5.7 | 20-43 | 35.0 | 10.6 | 28-28 | 28.0 | .7 |
| 4 | 3 | 35-45 | 40.0 | 5.0 | 4-5 | 4.0 | .6 | 30-41 | 35.0 | 5.5 | 34-48 | 39.0 | 5.0 | 25-37 | 31.0 | 6.0 |
| 5 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**Difference between junior and senior high school students' scores is significant at the .01 per cent level of sig.

Table 6. Skill achievement of senior high school students on Students Typewriting Tests as a function of the number of semesters of instruction

| | Number | Gross | | | | | | | | | Correct Words | | | Net Words | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | of | Words Per Minute | | | Errors | | | Gross Minus Errors | | | Per Minute | | | Per Minute | | |
| Semesters | Students | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD |
| 1 | 19 | 22-59 | 35.0 | 9.3 | 1-15 | 5.0** | 3.1 | 20-50 | 29.0** | 7.3 | 22-57 | 34.0** | 8.8 | 15-41 | 24.0** | 6.4 |
| 2 | 432 | 0-77 | 41.0 | 10.1 | 0-9 | 11.0 | 7.5 | 0-71 | 29.0 | 12.5 | 0-75 | 38.0 | 10.3 | 0-38 | 20.0 | 14.5 |
| 3 | 50 | 24-65 | 48.0 | 9.2 | 3-35 | 8.0 | 5.3 | 19-58 | 39.0 | 9.4 | 23-63 | 46.0 | 9.1 | 0-50 | 31.0 | 12.0 |
| 4 | 245 | 24-84 | 54.0* | 12.1 | 0-44 | 8.0 | 6.8 | 0-46 | 46.0 | 14.2 | 18-84 | 52.0 | 12.5 | 0-17 | 37.0 | 17.5 |
| 5 | 31 | 40-76 | 55.0 | 8.1 | 2-29 | 8.0 | 5.7 | 20-70 | 47.0 | 10.0 | 39-75 | 54.0 | 8.1 | 19-65 | 41.0 | 10.9 |
| 6 | 4 | 51-58 | 53.0 | 3.1 | 4-10 | 6.0 | 2.5 | 42-54 | 47.0 | 5.1 | 50-57 | 51.0 | 3.5 | 32-50 | 40.0 | 7.4 |

*Difference between junior and senior high school students' scores is significant at the .05 per cent level of sig.
**Difference between junior and senior high school students' scores is significant at the .01 per cent level of sig.

Table 7. Number of students meeting Federal Civil Service employment standards as a function of the number of semesters of typewriting instruction*

| Semesters of Instruction | Junior High Schools<br>Number of Students | <br>Number Mtg. Standards | <br>Per Cent | Senior High Schools<br>Number of Students | <br>Number Mtg. Standards | <br>Per Cent | Total<br>Number of Students | <br>Number Mtg. Standards | <br>Per Cent |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 106 | 0 | 0 | 19 | 0 | 0 | 125 | 0 | 0 |
| 2 | 742 | 73 | 9.8 | 432 | 24 | 5.6 | 1,174 | 97 | 8.2 |
| 3 | 2 | 0 | 0 | 50 | 3 | 6.0 | 52 | 3 | 5.8 |
| 4 | 3 | 0 | 0 | 245 | 41 | 16.7 | 248 | 41 | 16.5 |
| 5 | 0 | 0 | 0 | 31 | 6 | 19.4 | 31 | 6 | 19.4 |
| 6 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 0 |
|  | 853 | 73 | 8.6 | 781 | 74 | 9.5 | 1,634 | 147 | 9.0 |

*Forty words per minute with 3 errors or less was used as basis of comparison.

Table 8. Number of students meeting Utah Employment Security Standards as a function of the number of semesters of instruction*

| Semesters of Instruction | Junior High Schools Number of Students | Junior High Schools Number Mtg. Standards | Per Cent | Senior High Schools Number of Students | Senior High Schools Number Mtg. Standards | Per Cent | Total Number of Students | Total Number Mtg. Standards | Per Cent |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 106 | 0 | 0 | 19 | 0 | 0 | 125 | 0 | 0 |
| 2 | 742 | 45 | 6.1 | 432 | 25 | 5.8 | 1,174 | 70 | 6.1 |
| 3 | 2 | 0 | 0 | 50 | 7 | 14.0 | 52 | 7 | 13.5 |
| 4 | 3 | 0 | 0 | 245 | 94 | 38.4 | 248 | 94 | 37.9 |
| 5 | 0 | 0 | 0 | 31 | 7 | 22.6 | 31 | 7 | 22.6 |
| 6. | 0 | 0 | 0 | 4 | 1 | 25.0 | 4 | 1 | 25.0 |
|  | 853 | 45 | 5.5 | 781 | 134 | 17.2 | 1,634 | 179 | 11.1 |

*50 words per minute on manual typewriters and 55 words per minute on electric typewriters were used as basis of comparison.

Table 9. Skill achievement of first semester students on Students Typewriting Tests as a function of the students' grade level

| Grade Level | Number of Students | Gross Words Per Minute Range | Gross Words Per Minute Mean | Gross Words Per Minute SD | Errors Range | Errors Mean | Errors SD | Gross Minus Errors Range | Gross Minus Errors Mean | Gross Minus Errors SD | Correct Words Per Minute Range | Correct Words Per Minute Mean | Correct Words Per Minute SD | Net Words Per Minute Range | Net Words Per Minute Mean | Net Words Per Minute SD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 6 | 26–52 | 34.0 | 9.3 | 15–29 | 21.0 | 5.1 | 9–37 | 13.0 | 12.4 | 20–49 | 30.0 | 9.9 | 0–22 | 3 | 9.0 |
| 9 | 101 | 0–50 | 30.0 | 10.7 | 0–32 | 13.0 | 8.8 | 0–35 | 17.0 | 9.7 | 0–47 | 27.0 | 10.4 | 0–20 | 8.0 | 8.5 |
| 10 | 12 | 22–59 | 32.0 | 9.4 | 1–10 | 4.8 | 2.5 | 20–50 | 27.0 | 7.9 | 22–57 | 31.0 | 9.0 | 15–41 | 22.0 | 6.8 |
| 11 | 3 | 33–42 | 38.0 | 4.7 | 4–6 | 4.7 | 1.2 | 29–38 | 33.0 | 4.5 | 32–41 | 37.0 | 4.7 | 25–34 | 29.0 | 4.6 |
| 12 | 3 | 26–42 | 35.0 | 8.5 | 3–7 | 4.7 | 2.1 | 23–35 | 31.0 | 6.9 | 26–41 | 35.0 | 8.1 | 20–31 | 26.0 | 5.7 |

|  | 8 | 9 | 10 | 11 | 12 |  | 8 | 9 | 10 | 11 | 12 |  | 8 | 9 | 10 | 11 | 12 |  | 8 | 9 | 10 | 11 | 12 |  | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 |  | N | N | N | N | 8 |  | A | A | A | A | 8 |  | N | A | A | A | 8 |  | N | N | N | N | 8 |  | N | A | A | A |
| 9 |  |  | N | N | N | 9 |  |  | A | A | A | 9 |  |  | A | A | A | 9 |  |  | N | N | N | 9 |  |  | A | A | A |
| 10 |  |  |  | N | N | 10 |  |  |  | N | N | 10 |  |  |  | N | N | 10 |  |  |  | N | N | 10 |  |  |  | N | N |
| 11 |  |  |  |  | N | 11 |  |  |  |  | N | 11 |  |  |  |  | N | 11 |  |  |  |  | N | 11 |  |  |  |  | N |
| 12 |  |  |  |  |  | 12 |  |  |  |  |  | 12 |  |  |  |  |  | 12 |  |  |  |  |  | 12 |  |  |  |  |  |

A = Difference is significant at .01 per cent level of significance.
B = Difference is significant at .05 per cent level of significance.
N = No significant difference at .05 per cent level of significance was found.

Table 10. Skill achievement of second semester students on Students Typewriting Tests as a function of the students' grade level

| Grade Level | Number of Students | Gross Words Per Minute |  |  | Errors |  |  | Gross Minus Errors |  |  | Correct Words Per Minute |  |  | Net Words Per Minute |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD |
| 8 | 106 | 18-64 | 41.0 | 9.8 | 0-18 | 7.0 | 5.2 | 11-60 | 33.0 | 11.3 | 17-63 | 39.0 | 10.0 | 0-56 | 25.0 | 14.1 |
| 9 | 749 | 0-65 | 40.0 | 10.8 | 0-25 | 8.0 | 6.1 | 0-56 | 31.0 | 12.4 | 0-61 | 38.0 | 11.1 | 0-49 | 23.0 | 14.0 |
| 10 | 230 | 0-49 | 41.0 | 10.0 | 0-28 | 10.0 | 7.8 | 0-35 | 30.0 | 12.7 | 0-47 | 38.0 | 10.3 | 0-20 | 21.0 | 14.4 |
| 11 | 58 | 16-66 | 41.0 | 10.1 | 3-30 | 11.0 | 6.8 | 4-59 | 28.0 | 12.3 | 14-64 | 38.0 | 10.2 | 0-47 | 18.0 | 14.4 |
| 12 | 33 | 17-65 | 42.0 | 9.0 | 0-30 | 12.0 | 8.1 | 4-56 | 31.0 | 11.3 | 16-64 | 40.0 | 9.1 | 0-21 | 19.0 | 14.4 |

|  | 8 | 9 | 10 | 11 | 12 |  | 8 | 9 | 10 | 11 | 12 |  | 8 | 9 | 10 | 11 | 12 |  | 8 | 9 | 10 | 11 | 12 |  | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 |  | N | N | N | N | 8 |  | A | A | A | A | 8 |  | N | N | N | N | 8 |  | N | N | N | N | 8 |  | N | A | A | A |
| 9 |  |  | N | N | N | 9 |  |  | A | A | A | 9 |  |  | N | N | N | 9 |  |  | N | N | N | 9 |  |  | B | B | B |
| 10 |  |  |  | N | N | 10 |  |  |  | N | N | 10 |  |  |  | N | N | 10 |  |  |  | N | N | 10 |  |  |  | N | N |
| 11 |  |  |  |  | N | 11 |  |  |  |  | N | 11 |  |  |  |  | N | 11 |  |  |  |  | N | 11 |  |  |  |  | N |
| 12 |  |  |  |  |  | 12 |  |  |  |  |  | 12 |  |  |  |  |  | 12 |  |  |  |  |  | 12 |  |  |  |  |  |

A = Difference is significant at .01 per cent level of significance.
B = Difference is significant at .05 per cent level of significance.
N = No significant difference at .05 per cent level of significance was found.

Table 11. Skill achievement of third semester students on Students Typewriting Tests as a function of the students' grade level

| Grade Level | Number of Students | Gross Words Per Minute | | | Errors | | | Gross Minus Errors | | | Correct Words Per Minute | | | Net Words Per Minute | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD |
| 8 | 0 | 0 | | | | | | | | | | | | | | |
| 9 | 2 | 28-45 | 36.0 | 12.0 | 0-9 | 4.0 | 6.4 | 28-36 | 32.0 | 5.7 | 28-43 | 35.0 | 10.6 | 27-28 | 27.0 | .7 |
| 10 | 19 | 34-61 | 48.0 | 8.3 | 3-16 | 7.0 | 3.8 | 21-52 | 39.0 | 9.4 | 32-59 | 46.0 | 8.7 | 5-46 | 32.0 | 11.9 |
| 11 | 17 | 24-64 | 46.0 | 10.5 | 3-14 | 7.0 | 3.1 | 19-58 | 39.0 | 10.3 | 23-62 | 44.0 | 10.3 | 14-52 | 31.0 | 11.0 |
| 12 | 14 | 34-65 | 50.0 | 8.7 | 3-35 | 10.0 | 8.3 | 29-57 | 40.0 | 8.9 | 33-63 | 48.0 | 8.2 | 0-49 | 30.0 | 13.9 |

Significant differences were not determined.

Table 12. Skill achievement of fourth semester students on Students Typewriting Tests as a function of the students' grade level

| Grade Level | Number of Students | Gross Words Per Minute |  |  | Errors |  |  | Gross Minus Errors |  |  | Correct Words Per Minute |  |  | Net Words Per Minute |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD |
| 8 | 2 | 34-35 | 34.0 | .7 | 7-8 | 7.0 | .7 | 27 | 27 | .0 | 32-34 | 33.0 | 1.4 | 19-20 | 19.0 | .7 |
| 9 | 5 | 35-65 | 48.0 | 12.2 | 4-8 | 5.0 | 1.6 | 30-57 | 42.0 | 10.8 | 34-64 | 47.0 | 12.2 | 25-49 | 37.0 | 9.5 |
| 10 | 42 | 32-83 | 55.0 | 12.0 | 0-41 | 9.0 | 7.2 | 14-77 | 47.0 | 13.9 | 31-82 | 53.0 | 11.9 | 0-72 | 38.0 | 16.2 |
| 11 | 115 | 26-84 | 55.0 | 12.0 | 0-44 | 9.0 | 7.5 | 0-44 | 45.0 | 15.3 | 18-84 | 53.0 | 12.6 | 0-17 | 37.0 | 19.1 |
| 12 | 84 | 24-81 | 54.0 | 12.2 | 0-25 | 7.0 | 5.4 | 15-81 | 46.0 | 13.0 | 23-81 | 52.0 | 12.7 | 0-81 | 38.0 | 16.0 |

Significant differences were not determined.

Table 13. Skill achievement of fifth semester students on Students Typewriting Tests as a function of the students' grade level

| Grade Level | Number of Students | Gross Words Per Minute |  |  | Errors |  |  | Gross Minus Errors |  |  | Correct Words Per Minute |  |  | Net Words Per Minute |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD |
| 8 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 9 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 10 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 11 | 13 | 43-76 | 56.0 | 9.1 | 3-29 | 9.0 | 6.9 | 20-70 | 46.0 | 11.7 | 43-75 | 54.0 | 8.8 | 23.64 | 41.0 | 9.6 |
| 12 | 18 | 40-69 | 55.0 | 7.6 | 2-15 | 7.0 | 4.6 | 32-67 | 48.0 | 8.9 | 39-69 | 54.0 | 7.7 | 19-65 | 41.0 | 11.9 |

Significant differences were not determined.

Table 14. Skill achievement of sixth semester students on Students Typewriting Tests as a function of the students' grade level

| Grade Level | Number of Students | Gross Words Per Minute | | | Errors | | | Gross Minus Errors | | | Correct Words Per Minute | | | Net Words Per Minute | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD |
| 8 | 1 | 53 | | | 6 | | | 47 | | | 50 | | | 41 | | |
| 9 | 0 | 0 | | | | | | | | | | | | | | |
| 10 | 0 | 0 | | | | | | | | | | | | | | |
| 11 | 0 | 0 | | | | | | | | | | | | | | |
| 12 | 3 | 51-58 | 53.0 | 3.8 | 4-10 | 6.0 | 3.1 | 42-54 | 47.0 | 6.2 | 50-57 | 52.0 | 4.0 | 32-50 | 40.0 | 9.1 |

Significant differences were not determined.

Table 15. Number of students meeting Federal Civil Service employment standards as a function of the grade level of the students*

| | Eighth Grade | | | Ninth Grade | | | Tenth Grade | | | Eleventh Grade | | | Twelfth Grade | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Semesters | Total | Number | Per Cent | Total | Number | Per Cent | Total | Number | Per Cent | Total | Number | Per Cent | Total | Number | Per Cent |
| 1 | 6 | 0 | 0 | 101 | 0 | 0 | 12 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 |
| 2 | 106 | 10 | 9.4 | 747 | 68 | 9.1 | 230 | 17 | 7.4 | 58 | 2 | 3.4 | 33 | 0 | 0 |
| 3 | 0 | 0 | 0 | 2 | 0 | 0 | 19 | 1 | 5.3 | 17 | 1 | 5.9 | 14 | 1 | 7.1 |
| 4 | 2 | 0 | 0 | 5 | 0 | 0 | 42 | 6 | 14.3 | 115 | 19 | 16.5 | 84 | 16 | 19.0 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 2 | 15.4 | 18 | 4 | 22.2 |
| 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| | 115 | 10 | 8.7 | 855 | 68 | 8.0 | 303 | 24 | 7.9 | 206 | 24 | 11.7 | 155 | 21 | 13.5 |

*Forty words per minute with 3 errors or less was used as basis of comparison.

Table 16. Number of students meeting Utah Employment Security standards as a function of the grade level of the students*

| | Eighth Grade | | | Ninth Grade | | | Tenth Grade | | | Eleventh Grade | | | Twelfth Grade | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Semesters | Total | Number | Per Cent | Total | Number | Per Cent | Total | Number | Per Cent | Total | Number | Per Cent | Total | Number | Per Cent |
| 1 | 6 | 0 | 0 | 101 | 0 | 0 | 12 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 |
| 2 | 106 | 7 | 6.6 | 747 | 44 | 5.9 | 230 | 14 | 6.1 | 58 | 4 | 6.9 | 33 | 1 | 3.0 |
| 3 | 0 | 0 | 0 | 2 | 0 | 0 | 19 | 2 | 10.5 | 17 | 2 | 11.8 | 14 | 3 | 21.4 |
| 4 | 2 | 0 | 0 | 5 | 2 | 4.0 | 42 | 16 | 38.1 | 115 | 48 | 4.2 | 84 | 28 | 33.3 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 2 | 15.4 | 18 | 5 | 27.8 |
| 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 33.3 |
| | 115 | 7 | 6.1 | 855 | 46 | 5.4 | 303 | 32 | 10.6 | 206 | 56 | 27.2 | 155 | 38 | 24.5 |

*50 words per minute on manual typewriters and 55 words per minute on electric typewriters were used as basis of comparison.

Table 17. Skill achievement of first semester students on Students Typewriting Tests as a function of school enrollment

| School Enrollment | Number of Students | Gross Words Per Minute |  |  | Errors |  |  | Gross Minus Errors |  |  | Correct Words Per Minute |  |  | Net Words Per Minute |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD |
| 0-499 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 500-999 | 122 | 0-50 | 30 | 10.0 | 0-32 | 12.0 | 8.8 | 0-35 | 18.0 | 9.9 | 0-47 | 27.0 | 9.8 | 0-20 | 10.0 | 9.5 |
| 1000-1499 | 2 | 39-52 | 45 | 9.2 | 4-15 | 9.0 | 7.8 | 35-37 | 36.0 | 1.4 | 39-49 | 44.0 | 7.1 | 22-31 | 26.0 | 6.4 |
| 1500-over | 1 | 59 |  |  | 9 |  |  | 50 |  |  | 57 |  |  | 41 |  |  |

Significant differences were not determined.

Table 18. Skill achievement of second semester students on Students Typewriting Tests as a function of school enrollment

| School Enrollment | Number of Students | Gross Words Per Minute | | | Errors | | | Gross Minus Errors | | | Correct Words Per Minute | | | Net Words Per Minute | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD |
| 0-499 | 306 | 0-63 | 42.0 | 10.2 | 0-34 | 11.0 | 7.6 | 0-56 | 30.0 | 12.9 | 0-61 | 39.0 | 10.5 | 0-49 | 20.0 | 14.9 |
| 500-999 | 534 | 8-65 | 39.0 | 10.8 | 0-21 | 8.0 | 5.8 | 0-60 | 30.0 | 12.4 | 0-64 | 37.0 | 11.1 | 0-56 | 22.0 | 14.2 |
| 1000-1499 | 267 | 0-56 | 40.0 | 9.5 | 0-15 | 7.0 | 6.4 | 0-52 | 32.0 | 11.3 | 0-55 | 38.0 | 9.7 | 0-50 | 25.0 | 13.1 |
| 1500-over | 68 | 17-77 | 45.0 | 11.5 | 1-24 | 8.0 | 5.2 | 9-66 | 36.0 | 11.9 | 16-75 | 43.0 | 11.6 | 0-44 | 28.0 | 12.5 |

| | 1 | 2 | 3 | 4 | | 1 | 2 | 3 | 4 | | 1 | 2 | 3 | 4 | | 1 | 2 | 3 | 4 | | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | A | A | A | 1 | | A | A | A | 1 | | N | B | B | 1 | | A | N | A | 1 | | B | A | A |
| 2 | | | N | A | 2 | | | N | N | 2 | | | B | B | 2 | | | A | A | 2 | | | A | A |
| 3 | | | | A | 3 | | | | N | 3 | | | | B | 3 | | | | A | 3 | | | | N |
| 4 | | | | | 4 | | | | | 4 | | | | | 4 | | | | | 4 | | | | |

A = Difference is significant at .01 per cent level of significance.
B = Difference is significant at .05 per cent level of significance.
N = No significant difference at .05 per cent level of significance was found.

1 = 0-499
2 = 500-999
3 = 1,000-1,499
4 = 1,500-over

Table 19. Skill achievement of third semester students on Students Typewriting Tests as a function of school enrollment

| School Enrollment | Number of Students | Gross Words Per Minute | | | Errors | | | Gross Minus Errors | | | Correct Words Per Minute | | | Net Words Per Minute | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD |
| 0-499 | 7 | 43-64 | 53.0 | 6.6 | 4-14 | 8.0 | 3.6 | 29-57 | 45.0 | 9.1 | 41-62 | 52.0 | 6.7 | 15-50 | 36.0 | 12.2 |
| 500-999 | 3 | 37-65 | 55.0 | 15.9 | 4-35 | 15.0 | 17.1 | 30-57 | 40.0 | 14.8 | 36-63 | 52.0 | 14.4 | 29-50 | 26.0 | 25.1 |
| 1000-1499 | 38 | 28-64 | 46.0 | 8.5 | 3-19 | 7.0 | 3.9 | 21-58 | 38.0 | 8.8 | 28-62 | 45.0 | 8.5 | 5-52 | 31.0 | 10.8 |
| 1500-over | 4 | 24-54 | 40.0 | 12.5 | 4-10 | 5.0 | 2.9 | 19-44 | 34.0 | 11.0 | 23-52 | 39.0 | 12.1 | 14-36 | 28.0 | 10.0 |

No significant differences were found at the .05 per cent level of significance.

Table 20 . Skill achievement of fourth semester students on Students Typewriting Tests as a function of school enrollment

| School Enrollment | Number of Students | Gross Words Per Minute Range | Gross Words Per Minute Mean | Gross Words Per Minute SD | Errors Range | Errors Mean | Errors SD | Gross Minus Errors Range | Gross Minus Errors Mean | Gross Minus Errors SD | Correct Words Per Minute Range | Correct Words Per Minute Mean | Correct Words Per Minute SD | Net Words Per Minute Range | Net Words Per Minute Mean | Net Words Per Minute SD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-499 | 108 | 26-84 | 59.0 | 11.9 | 0-44 | 9.0 | 8.4 | 0-46 | 49.0 | 15.5 | 18-84 | 57.0 | 12.5 | 0-17 | 41.0 | 19.2 |
| 500-999 | 75 | 33-78 | 50.0 | 11.1 | 0-25 | 8.0 | 5.3 | 18-65 | 42.0 | 11.6 | 29-75 | 48.0 | 11.5 | 2-61 | 34.0 | 14.4 |
| 1000-1499 | 14 | 29-81 | 46.0 | 12.4 | 0-11 | 7.0 | 4.1 | 22-81 | 39.0 | 14.0 | 28-81 | 45.0 | 12.7 | 15-81 | 31.0 | 16.3 |
| 1500-over | 51 | 24-72 | 53.0 | 10.7 | 0-13 | 8.0 | 4.9 | 15-66 | 45.0 | 13.1 | 23-71 | 51.0 | 11.0 | 0-64 | 36.0 | 16.4 |

|  | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1 |  | A | A | A |
| 2 |  |  | N | N |
| 3 |  |  |  | B |
| 4 |  |  |  |  |

|  | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1 |  | N | N | N |
| 2 |  |  | N | N |
| 3 |  |  |  | N |
| 4 |  |  |  |  |

|  | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1 |  | A | A | B |
| 2 |  |  | N | N |
| 3 |  |  |  | A |
| 4 |  |  |  |  |

|  | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1 |  | A | A | A |
| 2 |  |  | N | N |
| 3 |  |  |  | N |
| 4 |  |  |  |  |

|  | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1 |  | B | A | N |
| 2 |  |  | N | N |
| 3 |  |  |  | N |
| 4 |  |  |  |  |

A = Difference is significant at .01 per cent level of significance.
B = Difference is significant at .05 per cent level of significance.
N = No significant difference at .05 per cent level of significance was found.

1 = 0-499
2 = 500-999
3 = 1000-1499
4 = 1500-over

Table 21. Skill achievement of fifth semester students on Students Typewriting Tests as a function of school enrollment

| School Enrollment | Number of Students | Gross Words Per Minute Range | Mean | SD | Errors Range | Mean | SD | Gross Minus Errors Range | Mean | SD | Correct Words Per Minute Range | Mean | SD | Net Words Per Minute Range | Mean | SD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-499 | 0 | | | | | | | | | | | | | | | |
| 500-999 | 5 | 40-59 | 52.0 | 8.4 | 2-10 | 5.0 | 4.1 | 38-54 | 47.0 | 5.8 | 39-58 | 51.0 | 8.0 | 36-48 | 42.0 | 5.2 |
| 1000-1499 | 1 | 69 | | | 2 | | | 67 | | | 69 | | | 65 | | |
| 1500-over | 25 | 43-76 | 56.0 | 7.8 | 2-29 | 8.0 | 5.8 | 20-70 | 47.0 | 10.2 | 43-75 | 54.0 | 7.7 | 19-64 | 40.0 | 10.9 |

No significant differences were determined.

Table 22. Skill achievement of sixth semester students on Students Typewriting Tests as a function of school enrollment

| School Enrollment | Number of Students | Gross Words Per Minute Range | Gross Words Per Minute Mean | Gross Words Per Minute SD | Errors Range | Errors Mean | Errors SD | Gross Minus Errors Range | Gross Minus Errors Mean | Gross Minus Errors SD | Correct Words Per Minute Range | Correct Words Per Minute Mean | Correct Words Per Minute SD | Net Words Per Minute Range | Net Words Per Minute Mean | Net Words Per Minute SD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-499 | 1 | 51 | 51 | .0 | 6 | 6 | .0 | 45 | 45 | .0 | 50 | 50 | .0 | 39 | 39 | .0 |
| 500-999 | 0 | | | | | | | | | | | | | | | |
| 1000-1499 | 1 | 58 | 58 | .0 | 4 | 4 | .0 | 54 | 54 | .0 | 57 | 57 | .0 | 50 | 50 | .0 |
| 1500-over | 2 | 52-53 | 52 | .7 | 6-10 | 8 | 2.8 | 42-47 | 44 | 3.5 | 50-50 | 50 | .0 | 32-41 | 36 | 6.4 |

No significant differences were determined.

Table 23. Number of students meeting Utah Employment Security standards as a function of the school enrollment*

| Semesters | 0-499 |  |  | 500-999 |  |  | 1,000-1,499 |  |  | 1,500-over |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Total | Number | Per Cent | Total | Number | Per Cent | Total | Number | Per Cent | Total | Number | Per Cent |
| 1 | 0 | 0 | 0 | 122 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 |
| 2 | 306 | 23 | 7.5 | 534 | 25 | 4.7 | 266 | 13 | 4.9 | 68 | 9 | 13.2 |
| 3 | 7 | 2 | 28.6 | 3 | 1 | 33.3 | 38 | 4 | 10.5 | 4 | 0 | 0 |
| 4 | 108 | 55 | 50.9 | 75 | 18 | 24.0 | 14 | 1 | 7.1 | 51 | 20 | 39.2 |
| 5 | 0 | 0 | 0 | 5 | 1 | 20.0 | 1 | 1 |  | 25 | 5 | 20.0 |
| 6 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |  | 2 | 0 | 0 |
|  | 422 | 80 | 19.0 | 739 | 45 | 6.1 | 322 | 20 | 6.2 | 151 | 34 | 22.5 |

*50 words per minute on manual typewriters and 55 words per minute on electric typewriters were used as basis of comparison.

Table 24. Number of students meeting Federal Civil Service employment standards as a function of the school enrollment*

| Semesters | 0-499<br>Total | Number | Per Cent | 500-999<br>Total | Number | Per Cent | 1,000-1,499<br>Total | Number | Per Cent | 1,500-over<br>Total | Number | Per Cent |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 122 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 |
| 2 | 306 | 19 | 6.2 | 534 | 45 | 8.4 | 266 | 30 | 11.2 | 68 | 3 | 4.4 |
| 3 | 7 | 0 | 0 | 3 | 0 | 0 | 38 | 3 | 7.9 | 4 | 0 | 0 |
| 4 | 108 | 19 | 17.6 | 75 | 15 | 2.0 | 14 | 2 | 14.3 | 51 | 5 | 9.8 |
| 5 | 0 | 0 | 0 | 5 | 2 | 4.0 | 1 | 1 |  | 25 | 3 | 12.0 |
| 6 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 |
|  | 422 | 38 | 9.0 | 739 | 62 | 8.4 | 322 | 36 | 11.1 | 151 | 11 | 7.3 |

*Forty words per minute with 3 errors or less was used as basis of comparison.

Table 25. Skill achievement of first semester students on Students Typewriting Tests as a function of class enrollment

| Class Enrollment | Number of Students | Gross Words Per Minute Range | Gross Words Per Minute Mean | Gross Words Per Minute SD | Errors Range | Errors Mean | Errors SD | Gross Minus Errors Range | Gross Minus Errors Mean | Gross Minus Errors SD | Correct Words Per Minute Range | Correct Words Per Minute Mean | Correct Words Per Minute SD | Net Words Per Minute Range | Net Words Per Minute Mean | Net Words Per Minute SD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-20 | 1 | 37 | | | 33 | | | 4 | | | 31 | | | 0 | | |
| 21-30 | 64 | 0-50 | 28.0 | 10.0 | 0-32 | 13.0 | 8.3 | 0-35 | 15.0 | 10.5 | 0-47 | 25.0 | 10.2 | 0-20 | 7.0 | 8.1 |
| 31-40 | 43 | 12-76 | 32.0 | 11.2 | 1-53 | 12.0 | 9.1 | 2-40 | 20.0 | 8.4 | 11-65 | 30.0 | 10.1 | 0-26 | 10.0 | 9.4 |
| 41-over | 17 | 22-59 | 33.0 | 8.8 | 1-10 | 4.0 | 2.2 | 20-50 | 29.0 | 7.4 | 22-57 | 32.0 | 8.4 | 15-41 | 24.0 | 6.5 |

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1 | | N | N | N |
| 2 | | | N | N |
| 3 | | | | N |
| 4 | | | | |

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1 | | B | B | A |
| 2 | | | N | A |
| 3 | | | | A |
| 4 | | | | |

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1 | | N | N | A |
| 2 | | | A | A |
| 3 | | | | A |
| 4 | | | | |

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1 | | N | N | N |
| 2 | | | B | B |
| 3 | | | | N |
| 4 | | | | |

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1 | | N | N | A |
| 2 | | | N | A |
| 3 | | | | A |
| 4 | | | | |

A = Difference is significant at .01 per cent level of significance.
B = Difference is significant at .05 per cent level of significance.
N = No significant difference at .05 per cent level of significance was found.

1 = 0-20
2 = 21-30
3 = 31-40
4 = 41-over

Table 26. Skill achievement of second semester students on Students Typewriting Tests as a function of class enrollment

| Class Enrollment | Number of Students | Gross Words Per Minute |  |  | Errors |  |  | Gross Minus Errors |  |  | Correct Words Per Minute |  |  | Net Words Per Minute |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD |
| 0-20 | 138 | 8-63 | 35.0 | 12.3 | 0-34 | 10.5 | 6.3 | 0-22 | 19.8 | 13.7 | 0-32 | 27.0 | 12.5 | 0-10 | 11.0 | 14.9 |
| 21-30 | 263 | 16-74 | 43.0 | 10.1 | 0-22 | 10.2 | 6.2 | 0-71 | 33.0 | 11.6 | 12-73 | 41.0 | 10.2 | 0-35 | 24.2 | 13.9 |
| 31-40 | 653 | 0-66 | 40.0 | 9.5 | 0-21 | 9.0 | 6.1 | 0-25 | 31.0 | 11.5 | 0-60 | 38.0 | 9.8 | 0-20 | 23.0 | 13.7 |
| 41-over | 124 | 22-77 | 42.0 | 11.2 | 0-17 | 10.3 | 9.1 | 0-53 | 32.0 | 14.5 | 20-75 | 40.0 | 11.9 | 0-53 | 24.4 | 16.1 |

|  | 1 | 2 | 3 | 4 |  | 1 | 2 | 3 | 4 |  | 1 | 2 | 3 | 4 |  | 1 | 2 | 3 | 4 |  | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 |  | A | A | A | 1 |  | N | B | N | 1 |  | A | A | A | 1 |  | A | A | A | 1 |  | A | A | A |
| 2 |  |  | B | N | 2 |  |  | B | N | 2 |  |  | A | N | 2 |  |  | A | N | 2 |  |  | N | N |
| 3 |  |  |  | B | 3 |  |  |  | B | 3 |  |  |  | N | 3 |  |  |  | B | 3 |  |  |  | N |
| 4 |  |  |  |  | 4 |  |  |  |  | 4 |  |  |  |  | 4 |  |  |  |  | 4 |  |  |  |  |

A = Difference is significant at .01 per cent level of significance.
B = Difference is significant at .05 per cent level of significance.
N = No significant difference at .05 per cent level of significance was found.

1 = 0-20
2 = 21-30
3 = 31-40
4 = 41-over

Table 27. Skill achievement of third semester students on Students Typewriting Tests as a function of class enrollment

| Class Enrollment | Number of Students | Gross Words Per Minute |  |  | Errors |  |  | Gross Minus Errors |  |  | Correct Words Per Minute |  |  | Net Words Per Minute |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD |
| 0-20 | 4 | 53-64 | 57.0 | 5.3 | 5-12 | 8.0 | 2.9 | 41-57 | 49.0 | 7.5 | 51-62 | 55.0 | 5.2 | 29-50 | 41.0 | 10.1 |
| 21-30 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 31-40 | 43 | 24-65 | 47.0 | 9.5 | 3-35 | 8.0 | 5.6 | 19-58 | 38.0 | 9.3 | 23-63 | 45.0 | 9.3 | 0-35 | 30.0 | 11.9 |
| 40-over. | 3 | 37-54 | 47.0 | 8.9 | 4-10 | 6.0 | 3.5 | 33-46 | 41.0 | 7.0 | 36-52 | 45.0 | 8.5 | 29-42 | 35.0 | 6.6 |

Significant differences were not determined.

Table 28. Skill achievement of fourth semester students on Students Typewriting Tests as a function of class enrollment

| Class Enrollment | Number of Students | Gross Words Per Minute |  |  | Errors |  |  | Gross Minus Errors |  |  | Correct Words Per Minute |  |  | Net Words Per Minute |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD |
| 0-20 | 34 | 32-78 | 53.0 | 11.6 | 2-25 | 8.0 | 5.4 | 25-75 | 45.0 | 11.1 | 31-77 | 52.0 | 11.2 | 10-72 | 36.0 | 13.0 |
| 21-30 | 51 | 26-83 | 56.0 | 13.1 | 2-44 | 12.0 | 10.0 | 0-46 | 44.0 | 16.9 | 18-82 | 53.0 | 13.8 | 0-17 | 33.0 | 20.2 |
| 31-40 | 124 | 24-84 | 53.0 | 12.9 | 0-22 | 8.0 | 5.4 | 15-84 | 45.0 | 15.1 | 23-84 | 51.0 | 13.6 | 0-84 | 37.0 | 18.5 |
| 40-over | 39 | 40-71 | 55.0 | 8.1 | 0-13 | 5.0 | 3.5 | 37-66 | 49.0 | 8.2 | 39-70 | 54.0 | 8.1 | 28-64 | 44.0 | 9.7 |

|  | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1 |  | N | N | N |
| 2 |  |  | N | N |
| 3 |  |  |  | N |
| 4 |  |  |  |  |

|  | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1 |  | B | N | B |
| 2 |  |  | A | A |
| 3 |  |  |  | B |
| 4 |  |  |  |  |

|  | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1 |  | N | N | N |
| 2 |  |  | N | N |
| 3 |  |  |  | N |
| 4 |  |  |  |  |

|  | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1 |  | N | N | N |
| 2 |  |  | N | N |
| 3 |  |  |  | N |
| 4 |  |  |  |  |

|  | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1 |  | N | N | B |
| 2 |  |  | N | N |
| 3 |  |  |  | N |
| 4 |  |  |  |  |

A = Difference is significant at .01 per cent level of significance.
B = Difference is significant at .05 per cent level of significance.
N = No significant difference at .05 per cent level of significance was found.

1 = 0-20
2 = 21-30
3 = 31-40
4 = 41-over

Table 29. Skill achievement of fifth semester students on Students Typewriting Tests as a function of class enrollment

| Class Enrollment | Number of Students | Gross Words Per Minute Range | Gross Words Per Minute Mean | Gross Words Per Minute SD | Errors Range | Errors Mean | Errors SD | Gross Minus Errors Range | Gross Minus Errors Mean | Gross Minus Errors SD | Correct Words Per Minute Range | Correct Words Per Minute Mean | Correct Words Per Minute SD | Net Words Per Minute Range | Net Words Per Minute Mean | Net Words Per Minute SD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-20 | 0 | | | | | | | | | | | | | | | |
| 21-30 | 0 | | | | | | | | | | | | | | | |
| 31-40 | 30 | 43-76 | 56.0 | 7.7 | 2-29 | 8.0 | 5.7 | 20-70 | 48.0 | 10.0 | 43-75 | 55.0 | 7.6 | 19-65 | 41.0 | 11.0 |
| 40-over | 1 | 40 | | | 2 | | | 38 | | | 39 | | | 36 | | |

Significant differences were not determined.

Table 30 . Skill achievement of sixth semester students on Students Typewriting Tests as a function of class enrollment

| Class Enrollment | Number of Students | Gross Words Per Minute |  |  | Errors |  |  | Gross Minus Errors |  |  | Correct Words Per Minute |  |  | Net Words Per Minute |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD |
| 0-20 | 1 | 51 |  |  | 6 |  |  | 45 |  |  | 50 |  |  | 39 |  |  |
| 21-30 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 31-40 | 3 | 52-58 | 54.0 | 3.2 | 4-10 | 6.0 | 3.1 | 42-54 | 47.0 | 6.0 | 50-57 | 52.0 | 4.0 | 32-50 | 41.0 | 9.0 |
| 41-over | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Significant differences were not determined.

Table 31. Number of students meeting Federal Civil Service employment standards as a function of the class enrollment*

| | 0-20 | | | 21-30 | | | 31-40 | | | 41-over | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Semesters | Total | Number | Per Cent | Total | Number | Per Cent | Total | Number | Per Cent | Total | Number | Per Cent |
| 1 | 1 | 0 | 0 | 64 | 0 | 0 | 43 | 0 | 0 | 17 | 0 | 0 |
| 2 | 138 | 11 | 8.0 | 260 | 15 | 5.8 | 652 | 58 | 8.9 | 124 | 13 | 10.5 |
| 3 | 4 | 0 | 0 | 0 | 0 | 0 | 45 | 3 | 6.7 | 3 | 0 | 0 |
| 4 | 34 | 3 | 8.8 | 51 | 4 | 7.8 | 124 | 47 | 37.9 | 39 | 14 | 36.9 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 | 30 | 5 | 16.6 | 1 | 1 | |
| 6 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| | 178 | 14 | 7.9 | 375 | 19 | 5.1 | 897 | 113 | 12.6 | 184 | 28 | 15.2 |

*Forty words per minute with 3 errors or less was used as basis of comparison.

Table 32. Number of students meeting Utah Employment Security standards as a function of class enrollment*

| Semesters | 0-20 |  |  | 21-30 |  |  | 31-40 |  |  | 41-over |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Total | Number | Per Cent | Total | Number | Per Cent | Total | Number | Per Cent | Total | Number | Per Cent |
| 1 | 1 | 0 | 0 | 64 | 0 | 0 | 43 | 0 | 0 | 17 | 0 | 0 |
| 2 | 138 | 8 | 5.8 | 260 | 21 | 8.1 | 652 | 24 | 3.7 | 124 | 17 | 13.7 |
| 3 | 4 | 2 | 50.0 | 0 | 0 | 0 | 45 | 5 | 11.1 | 3 | 0 | 0 |
| 4 | 34 | 10 | 29.4 | 51 | 19 | 8.7 | 124 | 47 | 37.9 | 39 | 18 | 46.2 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 | 30 | 7 | 23.3 | 1 | 0 | 0 |
| 6 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 33.3 | 0 | 0 | 0 |
|  | 178 | 20 | 11.2 | 375 | 40 | 11.0 | 897 | 84 | 9.4 | 184 | 35 | 19.0 |

*50 words per minute on manual typewriters and 55 words per minute on electric typewriters were used as basis of comparison.

Table 33. Skill achievement of first semester students on Students Typewriting Tests as a function of the length of class

| Length of Class | Number of Students | Gross Words Per Minute | | | Errors | | | Gross Minus Errors | | | Correct Words Per Minute | | | Net Words Per Minute | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD |
| 35-45 | 105 | 0-50 | 30.0 | 10.5 | 0-32 | 13.0 | 8.7 | 0-35 | 17.0 | 9.7 | 0-47 | 26.0 | 10.2 | 0-20 | 8.0 | 8.4 |
| 46-50 | 20 | 22-59 | 35.0 | 9.0 | 1-33 | 6.0 | 6.9 | 4-50 | 28.0 | 9.2 | 22-57 | 33.0 | 8.6 | 15-41 | 23.0 | 8.2 |
| 51-over | 0 | | | | | | | | | | | | | | | |

Significant differences were not determined.

Table 34. Skill achievement of second semester students on Students Typewriting Tests as a function of the length of class

| Length of Class | Number of Students | Gross Words Per Minute | | | Errors | | | Gross Minus Errors | | | Correct Words Per Minute | | | Net Words Per Minute | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD |
| 35-45 | 385 | 8-74 | 38.0 | 11.8 | 0-22 | 9.0 | 5.7 | 0-71 | 29.0 | 13.0 | 0-73 | 36.0 | 12.0 | 0-40 | 21.0 | 14.4 |
| 46-50 | 625 | 0-65 | 41.0 | 9.6 | 0-35 | 9.0 | 6.5 | 0-52 | 32.0 | 11.5 | 0-63 | 39.0 | 9.7 | 0-50 | 23.0 | 13.7 |
| 51-over | 166 | 17-68 | 42.0 | 10.0 | 0-4 | 9.0 | 8.4 | 0-59 | 32.0 | 13.5 | 16-67 | 39.0 | 10.7 | 0-51 | 24.0 | 15.4 |

| | 1 | 2 | 3 | | 1 | 2 | 3 | | 1 | 2 | 3 | | 1 | 2 | 3 | | 1 | 2 | 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | A | A | 1 | | N | N | 1 | | B | B | 1 | | A | A | 1 | | N | N |
| 2 | | | N | 2 | | | N | 2 | | | N | 2 | | | N | 2 | | | N |
| 3 | | | | 3 | | | | 3 | | | | 3 | | | | 3 | | | |

A = Difference is significant at .01 per cent level of significance.
B = Difference is significant at .05 per cent level of significance.
N = No significant difference at .05 per cent level of significance was found.

1 = 35-45 minute class periods
2 = 46-50 minute class periods
3 = 51-over minute class periods

Table 35. Skill achievement of third semester students on Students Typewriting Tests as a function of the length of class

| Length of Class | Number of Students | Gross Words Per Minute |  |  | Errors |  |  | Gross Minus Errors |  |  | Correct Words Per Minute |  |  | Net Words Per Minute |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD |
| 35-45 | 4 | 28-59 | 46.0 | 13.5 | 5-12 | 6.0 | 5.2 | 28-54 | 39.0 | 10.9 | 28-58 | 45.0 | 12.9 | 27-49 | 33.0 | 10.5 |
| 46-50 | 46 | 24-65 | 47.0 | 9.1 | 3-35 | 8.0 | 5.5 | 19-58 | 38.0 | 9.1 | 23-62 | 45.0 | 8.9 | 0-50 | 31.0 | 11.8 |
| 51-over | 2 | 50-64 | 57.0 | 9.9 | 4-7 | 5.0 | 2.1 | 46-57 | 51.0 | 7.8 | 49-63 | 56.0 | 9.9 | 42-50 | 46.0 | 5.7 |

Significant differences were not determined.

Table 36. Skill achievement of fourth semester students on Students Typewriting Tests as a function of the length of class

| Length of Class | Number of Students | Gross Words Per Minute | | | Errors | | | Gross Minus Errors | | | Correct Words Per Minute | | | Net Words Per Minute | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD |
| 35-45 | 64 | 35-84 | 62.0 | 10.6 | 0-14 | 6.0 | 5.4 | 14-84 | 56.0 | 12.7 | 34-84 | 61.0 | 10.9 | 0-84 | 50.0 | 14.8 |
| 46-50 | 159 | 24-81 | 52.0 | 11.2 | 0-44 | 9.0 | 7.3 | 0-46 | 42.0 | 12.9 | 18-81 | 49.0 | 11.2 | 0-17 | 32.0 | 16.2 |
| 51-over | 25 | 33-78 | 52.0 | 13.8 | 1-17 | 8.0 | 4.0 | 22-65 | 43.0 | 13.8 | 29-75 | 48.0 | 14.9 | 5-61 | 34.0 | 15.0 |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | | 1 | 2 | 3 | | 1 | 2 | 3 | | 1 | 2 | 3 | | 1 | 2 | 3 |
| 1 | | A | A | 1 | | A | N | 1 | | A | A | 1 | | A | A | 1 | | A | A |
| 2 | | | N | 2 | | | N | 2 | | | N | 2 | | | N | 2 | | | N |
| 3 | | | | 3 | | | | 3 | | | | 3 | | | | 3 | | | |

A = Difference is significant at .01 per cent level of significance.
B = Difference is significant at .05 per cent level of significance.
N = No significant difference at .05 per cent level of significance was found.

1 = 35-45 minute class periods
2 = 46-50 minute class periods
3 = 51-over minute class periods

Table 37. Skill achievement of fifth semester students on Students Typewriting Tests as a function of the length of class

| Length of Class | Number of Students | Gross Words Per Minute |  |  | Errors |  |  | Gross Minus Errors |  |  | Correct Words Per Minute |  |  | Net Words Per Minute |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD |
| 35-45 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 46-50 | 31 | 40-76 | 55.0 | 8.1 | 2-29 | 8.0 | 5.7 | 20-70 | 47.0 | 10.0 | 39-75 | 54.0 | 8.1 | 19-65 | 41.0 | 10.9 |
| 51-over | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Significant differences were not determined.

Table 38. Skill achievement of sixth semester students on Students Typewriting Tests as a function of the length of class

| Length of Class | Number of Students | Gross Words Per Minute |  |  | Errors |  |  | Gross Minus Errors |  |  | Correct Words Per Minute |  |  | Net Words Per Minute |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD | Range | Mean | SD |
| 35-45 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 46-50 | 4 | 51-58 | 53.0 | 3.1 | 4-10 | 6.0 | 2.5 | 42-54 | 47.0 | 5.1 | 50-57 | 51.0 | 3.5 | 32-50 | 40.0 | 7.4 |
| 51-over | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Significant differences were not determined.

Table 39. Number of students meeting Federal Civil Service standards as a function of length of class*

| Semesters | 35-45 Minutes |  |  | 46-50 Minutes |  |  | 51-over |  |  |
|---|---|---|---|---|---|---|---|---|---|
|  | Total | Number | Per Cent | Total | Number | Per Cent | Total | Number | Per Cent |
| 1 | 105 | 0 | 0 | 20 | 0 | 0 | 0 | 0 | 0 |
| 2 | 385 | 27 | 7.0 | 623 | 53 | 8.5 | 166 | 17 | 10.2 |
| 3 | 4 | 0 | 0 | 46 | 3 | 6.5 | 2 | 0 | 0 |
| 4 | 64 | 16 | 25.0 | 159 | 25 | 15.7 | 25 | 0 | 0 |
| 5 | 0 | 0 | 0 | 31 | 6 | 19.4 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 |
|  | 558 | 43 | 7.7 | 883 | 87 | 9.9 | 193 | 17 | 10.2 |

*Forty words per minute with 3 errors or less was used as basis of comparison.

Table 40. Number of students meeting Utah Employment Security standards as a function of the length of class*

| Semesters | 35-45 Minutes |  |  | 46-50 Minutes |  |  | 51-over |  |  |
|---|---|---|---|---|---|---|---|---|---|
|  | Total | Number | Per Cent | Total | Number | Per Cent | Total | Number | Per Cent |
| 1 | 105 | 0 | 0 | 20 | 0 | 0 | 0 | 0 | 0 |
| 2 | 385 | 20 | 5.2 | 623 | 32 | 5.1 | 166 | 18 | 10.8 |
| 3 | 4 | 1 | 25.0 | 46 | 5 | 10.9 | 2 | 1 | 50.0 |
| 4 | 64 | 46 | 71.9 | 159 | 39 | 24.5 | 25 | 9 | 10.8 |
| 5 | 0 | 0 | 0 | 31 | 7 | 22.6 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 | 4 | 1 | 25.0 | 0 | 0 | 0 |
|  | 558 | 67 | 12.0 | 883 | 84 | 9.5 | 193 | 28 | 14.5 |

*50 words per minute on manual typewriters and 55 words per minute on electric typewriters were used as basis of comparison.

Table 41. Skill achievement of students on Students Typewriting Tests as a function of whether the students were using manual or electric typewriters

| | One Semester | | Two Semesters | | Three Semesters | | Four Semesters | | Five Semesters | | Six Semesters | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Manual | Electric | Manual | Electric | Manual | Electric | Manual | Electric | Manual | Electric | Manual | Electric |
| No. of Students | 98 | 27 | 1121 | 53 | 48 | 4 | 207 | 41 | 6 | 25 | 1 | 3 |
| Gross Words Per Minute | | | | | | | | | | | | |
| Range | 0-50 | 16-76 | 8-74 | 0-77 | 24-65 | 39-64 | 24-84 | 32-78 | 43-69 | 40-76 | | 51-53 |
| Mean | 30.0 | 32.0 | 40.0 | 40.0 | 47.0 | 50.0 | 54.0 | 58.0* | 55.0 | 56.0 | 58* | 52.0 |
| SD | 9.5 | 13.3 | 10.4 | 12.1 | 9.5 | 11.0 | 12.1 | 12.0 | 9.3 | 8.0 | | 1.0 |
| Errors | | | | | | | | | | | | |
| Range | 0-32 | 1-53 | 0-9 | 0-29 | 3-35 | 4-8 | 0-44 | 2-41 | 2-10 | 2-29 | | 6-10 |
| Mean | 12.0 | 11.0 | 9.0** | 12.0 | 8.0 | 5.0 | 8.0 | 9.0 | 4.0 | 8.0 | 4 | 7.0 |
| SD | 8.1 | 10.7 | 6.6 | 6.2 | 5.0 | 2.1 | 6.7 | 7.0 | 3.8 | 5.8 | | |
| Gross Minus Errors | | | | | | | | | | | | |
| Range | 0-35 | 2-50 | 0-71 | 0-66 | 19-58 | 35-57 | 0-46 | 14-75 | 40-67 | 20-70 | 54 | 42-47 |
| Mean | 18.0 | 21.0 | 31.0* | 27.0 | 38.0 | 44.0 | 45.0 | 48.0 | 50.0 | 47.0 | | 44.0 |
| SD | 10.7 | 9.1 | 12.2 | 12.8 | 9.4 | 9.4 | 14.3 | 13.3 | 9.1 | 10.3 | | 2.5 |
| Correct Words Per Minute | | | | | | | | | | | | |
| Range | 0-47 | 14-65 | 0-73 | 0-75 | 23-62 | 38-63 | 18-84 | 31-77 | 43-69 | 39-75 | 57 | 50-50 |
| Mean | 27.0 | 30.0 | 38.0 | 37.0 | 45.0 | 49.0 | 52.0 | 55.0 | 54.0 | 54.0 | | 50 |
| SD | 9.7 | 11.8 | 10.6 | 12.3 | 9.2 | 11.0 | 12.5 | 12.4 | 9.1 | 8.0 | | .0 |
| Net Words Per Minute | | | | | | | | | | | | |
| Range | 0-20 | 0-19 | 0-38 | 0-31 | 0-50 | 31-50 | 0-37 | 0-72 | 37-65 | 19-64 | 50 | 32-41 |
| Mean | 10.0 | 12.0 | 23.0** | 16.0 | 31.0 | 38.0 | 37.0 | 39.0 | 46.0 | 40.0 | | 37.0 |
| SD | 9.7 | 11.0 | 14.2 | 13.7 | 11.9 | 8.1 | 17.7 | 15.9 | 10.3 | 10.9 | | 4.7 |

*Difference is significant at the .05 per cent level of significance.

**Difference is significant at the .01 per cent level of significance.

Table 42. Number of students meeting Federal Civil Service standards as a function of whether the students were using manual or electric typewriters*

|  | Manual |  |  | Electric |  |  |
|---|---|---|---|---|---|---|
| Semesters | Total | Number | Per Cent | Total | Number | Per Cent |
| 1 | 98 | 0 | 0 | 27 | 0 | 0 |
| 2 | 1121 | 96 | 8.6 | 53 | 1 | 1.9 |
| 3 | 48 | 3 | 6.3 | 4 | 0 | 0 |
| 4 | 207 | 36 | 17.4 | 41 | 15 | 36.6 |
| 5 | 6 | 3 | 50.0 | 25 | 3 | 12.0 |
| 6 | 1 | 0 | 0 | 3 | 0 | 0 |
|  | 1481 | 138 | 9.3 | 153 | 19 | 11.9 |

*Forty words per minute with 3 errors or less was used as basis of comparison.

Table 43. Number of students meeting Utah Employment Security standards as a function of whether the students were using manual or electric typewriters*

| Semesters | Manual Total | Manual Number | Manual Per Cent | Electric Total | Electric Number | Electric Per Cent |
|---|---|---|---|---|---|---|
| 1 | 98 | 0 | 0 | 19 | 0 | 0 |
| 2 | 1121 | 68 | 6.1 | 53 | 2 | 6.2 |
| 3 | 48 | 6 | 12.5 | 4 | 1 | 26.1 |
| 4 | 207 | 79 | 38.2 | 41 | 15 | 36.6 |
| 5 | 6 | 2 | 33.3 | 25 | 5 | 20.0 |
| 6 | 1 | 1 | 100.0 | 3 | 0 | 0 |
|  | 1481 | 156 | 10.5 | 153 | 21 | 13.7 |

*50 words per minute on manual typewriters and 55 words per minute on electric typewriters were used as basis of comparison.

Table 44. Skill achievement of students on Students Typewriting Tests as a function of whether homework assignments had been given

|  | One Semester |  | Two Semesters |  | Three Semesters |  | Four Semesters |  | Five Semesters |  | Six Semesters |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Yes | No | Yes | No | Yes | No | Yes | No | Yes | No | Yes | No |
| No. of Students | 0 | 125 | 80 | 1094 | 0 | 52 | 0 | 248 | 0 | 31 | 0 | 4 |
| **Gross Words Per Minute** |  |  |  |  |  |  |  |  |  |  |  |  |
| Range | 0 | 0–50 | 8–63 | 0–77 | 0 | 24–65 | 0 | 24–84 | 0 | 40–76 | 0 | 51–58 |
| Mean |  | 30.0 | 33.0 | 41.0 |  | 47.0 |  | 54.0 |  | 55.0 |  | 53.0 |
| SD |  | 10.4 | 13.4 | 10.0 |  | 9.5 |  | 12.1 |  | 8.1 |  | 3.1 |
| **Errors** |  |  |  |  |  |  |  |  |  |  |  |  |
| Range | 0 | 0–32 | 2–27 | 0–9 | 0 | 3–35 | 0 | 0–44 | 0 | 2–29 | 0 | 4–10 |
| Mean |  | 12.0 | 10.0 | 9.0 |  | 8.0 |  | 8.0 |  | 8.0 |  | 6.0 |
| SD |  | 8.7 | 5.9 | 6.6 |  | 5.3 |  | 6.7 |  | 5.7 |  | 2.5 |
| **Gross Minus Errors** |  |  |  |  |  |  |  |  |  |  |  |  |
| Range | 0 | 0–35 | 0–56 | 0–71 | 0 | 19–58 | 0 | 0–46 | 0 | 20–70 | 0 | 42.54 |
| Mean |  | 18.0 | 23.0 | 32.0 |  | 39.0 |  | 46.0 |  | 47.0 |  | 47.0 |
| SD |  | 10.4 | 13.9 | 11.9 |  | 9.4 |  | 14.2 |  | 10.0 |  | 5.1 |
| **Correct Words Per Minute** |  |  |  |  |  |  |  |  |  |  |  |  |
| Range | 0 | 0–47 | 0–61 | 0–75 | 0 | 23–63 | 0 | 18–84 | 0 | 39–75 | 0 | 50–57 |
| Mean |  | 28.0 | 30.0 | 39.0 |  | 46.0 |  | 52.0 |  | 54.0 |  | 51.0 |
| SD |  | 10.3 | 13.4 | 10.2 |  | 9.3 |  | 12.6 |  | 8.1 |  | 3.5 |
| **Net Words Per Minute** |  |  |  |  |  |  |  |  |  |  |  |  |
| Range | 0 | 0–20 | 0–49 | 0–38 | 0 | 0–50 | 0 | 0–37 | 0 | 19–65 | 0 | 32–50 |
| Mean |  | 10.0 | 15.0 | 23.0 |  | 31.0 |  | 37.0 |  | 41.0 |  | 40.0 |
| SD |  | 10.0 | 14.0 | 14.0 |  | 11.8 |  | 17.4 |  | 10.9 |  | 7.4 |

Significant differences were not determined.

Table 45. Number of students meeting Federal Civil Service standards as a function of whether or not students have had homework assignments*

| Semesters | Homework Assignment |  |  | No Homework Assignment |  |  |
|---|---|---|---|---|---|---|
|  | Total | Number | Per Cent | Total | Number | Per Cent |
| 1 | 0 | 0 | 0 | 125 | 0 | 0 |
| 2 | 80 | 1 | 1.3 | 1094 | 96 | 8.8 |
| 3 | 0 | 0 | 0 | 52 | 3 | 5.8 |
| 4 | 0 | 0 | 0 | 248 | 41 | 16.5 |
| 5 | 0 | 0 | 0 | 31 | 6 | 19.4 |
| 6 | 0 | 0 | 0 | 4 | 0 | 0 |
|  | 80 | 1 | 1.3 | 1554 | 146 | 9.4 |

*Forty words per minute with 3 errors or less was used as basis of comparison.

Table 46. Number of students meeting Utah Employment Security standards as a function of whether or not students have had homework assignments*

| Semesters | Homework Assignments Total | Homework Assignments Number | Homework Assignments Per Cent | No Homework Assignments Total | No Homework Assignments Number | No Homework Assignments Per Cent |
|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 125 | 0 | 0 |
| 2 | 80 | 4 | 5.0 | 1094 | 66 | 6.2 |
| 3 | 0 | 0 | 0 | 52 | 7 | 13.5 |
| 4 | 0 | 0 | 0 | 248 | 94 | 37.9 |
| 5 | 0 | 0 | 0 | 31 | 7 | 22.6 |
| 6 | 0 | 0 | 0 | 4 | 1 | 25.0 |
|  | 80 | 4 | 5.0 | 1554 | 177 | 11.4 |

*50 words per minute on manual typewrtiers and 55 words per minute on electric typewriters were used as basis of comparison.

Table 47. Skill achievement of students on Students Typewriting Tests as a function of whether they had additional typewriting instruction

| | One Semester | | Two Semesters | | Three Semesters | | Four Semesters | | Five Semesters | | Six Semesters | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Yes | No | Yes | No | Yes | No | Yes | No | Yes | No | Yes | No |
| No. of Students | 13 | 112 | 39 | 1135 | 7 | 45 | 14 | 234 | 1 | 30 | 0 | 4 |
| Gross Words Per Minute | | | | | | | | | | | | |
| Range | 23-59 | 0-50 | 24-36 | 0-77 | 33-54 | 24-65 | 33-78 | 24-84 | 61 | 40-76 | | 51-58 |
| Mean | 36.0* | 30.0 | 45.0** | 40.0 | 43.0 | 48.0 | 54.0 | 54.0 | | 55.0 | 0 | 53.0 |
| SD | 9.8 | 10.3 | 10.0 | 10.4 | 8.3 | 9.6 | 12.2 | 12.2 | | 8.2 | | 3.1 |
| Errors | | | | | | | | | | | | |
| Range | 3-29 | 0-32 | 1-29 | 0-9 | 4-19 | 3-35 | 0-15 | 0-44 | 15 | 2-29 | | 4-10 |
| Mean | 11.0 | 12.0 | 8.0 | 9.0 | 8.0 | 8.0 | 7.0 | 8.0 | | 7.0 | 0 | 6.0 |
| SD | 7.8 | 8.9 | 6.4 | 6.6 | 5.3 | 5.4 | 4.3 | 6.9 | | 5.6 | | 2.5 |
| Gross Minus Errors | | | | | | | | | | | | |
| Range | 0-35 | 0-31 | 11-59 | 0-71 | 24-46 | 19-58 | 26-65 | 0-46 | 46 | 20-70 | | 42-54 |
| Mean | 24.0* | 18.0 | 36.0** | 31.0 | 35.0 | 39.0 | 47.0 | 45.0 | | 47.0 | 0 | 47.0 |
| SD | 12.4 | 10.0 | 12.5 | 12.2 | 8.2 | 9.5 | 12.3 | 14.3 | | 10.2 | | 5.1 |
| Correct Words Per Minute | | | | | | | | | | | | |
| Range | 19-57 | 0-46 | 22-64 | 0-75 | 31-52 | 23-63 | 31-75 | 18-84 | 58 | 39-75 | 0 | 50-57 |
| Mean | 34.0* | 27.0 | 43.0** | 38.0 | 42.0 | 46.0 | 53.0 | 52.0 | | 54.0 | 0 | 51.0 |
| SD | 10.3 | 10.1 | 10.1 | 10.7 | 8.1 | 9.4 | 12.1 | 12.6 | | 8.2 | | 3.5 |
| Net Words Per Minute | | | | | | | | | | | | |
| Range | 0-29 | 0-15 | 0-53 | 0-38 | 11-42 | 0-50 | 18-61 | 0-37 | 31 | 19-65 | | 32-50 |
| Mean | 16.0* | 9.0 | 29.0** | 22.0 | 26.0 | 32.0 | 39.0 | 37.0 | | 41.0 | | 40.0 |
| SD | 11.9 | 9.6 | 15.1 | 14.1 | 10.9 | 11.9 | 13.9 | 17.6 | | 10.9 | 0 | 7.4 |

*Difference is significant at the .05 per cent level of significance.
**Difference is significant at the .01 per cent level of significance.

Table 48. Number of students meeting Federal Civil Service standards as a function of whether or not they have had additional typewriting instruction*

| Semesters | Additional Instruction<br>Total | <br>Number | <br>Per Cent | No Additional Instruction<br>Total | <br>Number | <br>Per Cent |
|---|---|---|---|---|---|---|
| 1 | 13 | 0 | 0 | 112 | 0 | 0 |
| 2 | 39 | 7 | 18.3 | 1135 | 90 | 7.9 |
| 3 | 7 | 0 | 0 | 45 | 3 | 6.7 |
| 4 | 14 | 2 | 14.3 | 234 | 39 | 16.7 |
| 5 | 1 | 0 | 0 | 30 | 6 | 20.1 |
| 6 | 0 | 0 | 0 | 4 | 1 | 25.0 |
|  | 74 | 9 | 12.2 | 1560 | 138 | 8.7 |

*Forty words per minute with 3 errors or less was used as basis of comparison.

Table 49. Number of students meeting Utah Employment Security standards as a function of whether or not they have had additional typewriting instruction*

| Semesters | Additional Instruction |  |  | No Additional Instruction |  |  |
|---|---|---|---|---|---|---|
|  | Total | Number | Per Cent | Total | Number | Per Cent |
| 1 | 13 | 0 | 0 | 112 | 0 | 0 |
| 2 | 39 | 4 | 10.3 | 1135 | 66 | 6.0 |
| 3 | 7 | 0 | 0 | 45 | 7 | 15.5 |
| 4 | 14 | 7 | 50.0 | 234 | 87 | 37.2 |
| 5 | 1 | 0 | 0 | 30 | 7 | 23.3 |
| 6 | 0 | 0 | 0 | 4 | 1 | 25.0 |
|  | 74 | 11 | 14.1 | 1560 | 170 | 10.8 |

*50 words per minute on manual typewriters and 55 words per minute on electric typewriters were used as basis of comparison.